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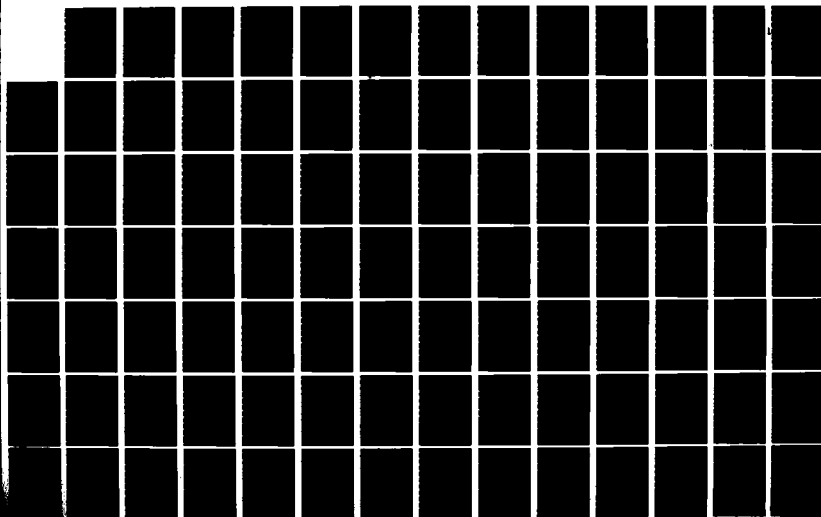
ESTABLISHMENT AND DISCONTINUANCE CRITERIA FOR AUTOMATED 1/2
WEATHER OBSERVING SYSTEMS (AWOS)(U) FEDERAL AVIATION
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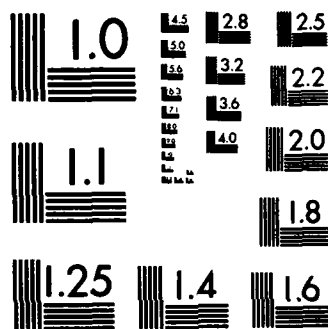
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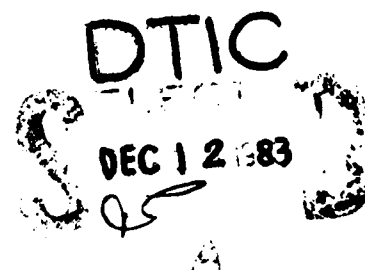


U.S. Department
of Transportation
Federal Aviation
Administration

1.2

Establishment and Discontinuance Criteria for Automated Weather Observing Systems (AWOS)

Office of Aviation
Policy and Plans
Washington, D.C. 20591



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May 1983

Ward L. Keech

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16. Abstract This report develops establishment and discontinuance criteria for automated weather observing systems (AWOS) for publication in FAA Order 7031.2B, Airway Planning Standard Number One. Airway Planning Standard Number One contains the policy and summarizes the criteria used in determining eligibility of terminal locations for establishment, discontinuance and improvements of air navigation facilities and air traffic control services. The criteria developed in this report are based on rigorous life-cycle cost effectiveness and benefit/cost analyses of AWOS which measure weather and environmental parameters essential to FAA operations--wind direction and speed, temperature and dew point, altimeter setting, ceiling, visibility, precipitation and thunderstorm activity.			
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EXECUTIVE SUMMARY

The purpose of this report is to develop establishment and discontinuance criteria for automated weather observing systems (AWOS) for publication in FAA Order 7031.2B, Airway Planning Standard Number One. Airway Planning Standard Number One contains the policy and summarizes the criteria used in determining eligibility of terminal locations for establishment, discontinuance and improvements of air navigation facilities and air traffic control services.

Accurate and reliable advance weather information is essential to the safety and efficiency of aviation, and surface weather observations are the most important portion of it. There are over 1,400 surface weather observation stations in the U.S. operated by the National Weather Service (NWS), the Department of Defense, the FAA and various aircraft operators. Support for civil flight operations is currently limited primarily to major airports where observations are taken by the NWS, FAA-operated ATCT's and FSS's, and commercially-operated Supplementary Aviation Weather Reporting Stations.

Although the continuing growth of aviation has increased the demand for weather reports and forecasts at additional locations, the escalating costs of labor-intensive manual weather observing systems has prohibited their expansion to additional locations. Surface weather observing stations are widely separated in certain areas, affecting the accuracy and reliability of weather forecasts in those areas. Commercial instrument flight rule (IFR) operations under Parts 121 and 135 of the Federal Aviation Regulations (FAR) are restricted at over 1,200 airports with standard instrument approach procedures because of the absence of a local weather reporting service and at approximately 376 airports where the service is provided only part-time. Non-commercial IFR operations conducted under FAR Part 91 are authorized at locations without a local weather reporting service, but the minimum altitude of the approach procedures at these locations is increased in relation to the distance from the remote altimeter setting source to account for potential differences in barometric pressure. Of 1,733 airports currently with approved standard instrument approach procedures, IFR approaches by Part 91 operators at 1,307 locations are conducted with altitude information derived from a remote source. Full time remote altimeter setting penalties are required at approximately 931 airports.

These conditions suggest a need to maintain and expand accurate and reliable weather information services at sufficient locations to meet the needs of pilots, operators and air traffic control facilities. Automation of the surface weather observation function will meet this need by reducing the time devoted to weather observations at manned locations, providing a capability of taking observations at locations when facilities are closed, and expanding observation services to unmanned locations.

The establishment and discontinuance criteria developed in this report are based on a life-cycle cost effectiveness analysis for FAA towered airports and a life-cycle benefit/cost analysis for non-towered and

non-federal towered airports. FAA towered airports, by virtue of the fact that they constitute control zones, are required by FAR Part 91 to have an approved weather observation service. Most equipment currently installed in manual weather observing systems is on average 20 years old and reaching the end of its economic life. Given these regulatory and operating constraints, this report summarizes a life-cycle cost analysis of various alternative systems of collecting, recording and disseminating weather data. The analysis clearly shows that AWOS is the most cost effective means of providing weather observation services at FAA towered airports.

In a rigorous life-cycle benefit/cost analysis of AWOS at non-towered and non-federal towered airports, the basic benefit areas of enhanced safety and efficiency are analyzed. Official aviation activity forecasts are used to quantify the benefits independently for each year of a system's estimated 15 year economic life and discounting the benefits for each year to their present value. These are summed to represent the present value of life-cycle benefits. Capital, operations and maintenance costs are approached on a similar present value life-cycle basis. AWOS criteria for non-towered and non-federal towered airports are developed modularly to facilitate investment decisionmaking for AWOS with any configuration of wind direction and speed, temperature/dew point, altimeter setting, ceiling, visibility, liquid and freezing precipitation, and thunderstorm sensors.

It is impossible, at least with a high degree of accuracy, to assess the impact of the criteria on agency resources as required by Order 1320.1 because (1) it is presently uncertain which specific AWOS configuration will be justified for each qualifying airport, and (2) meeting candidacy levels will not mean automatic qualification for non-towered and non-federal towered airports since benefit/cost screening is but one of several inputs to the FAA decisionmaking process relative to investment in facilities and equipment. All FAA towered airports, other than tower discontinuance candidates, where the surface weather observation function is the responsibility of the FAA (as opposed to the NWS) qualify for AWOS by virtue of cost effectiveness. There are currently 254 such locations. Priority of AWOS establishment at these locations will be given to part-time facilities, followed by full-time facilities, in recognition of the relatively greater benefits of AWOS when facilities are closed. Additionally, automated flight service stations that are obligated to take weather observations automatically qualify for AWOS. Assuming installation of systems with wind, temperature/dewpoint, altimeter setting, ceiling, visibility and liquid precipitation sensors, an additional 1,120 civil airport locations where NWS aviation weather observations are not presently available meet the establishment criteria. These include 1,035 non-towered airports, 49 FAA tower discontinuance candidate locations and 36 non-federal tower locations.

At average life-cycle unit costs of approximately \$165,300 and \$150,500 per system for towered and non-towered airports respectively, these installations equate to approximately \$210.5 million (1981 dollars). Approximately 60 percent of the investment is incurred for facilities and equipment in the acquisition year, with the remainder representing operations and maintenance costs over an estimated 15-year economic life.

CHAPTER 1 - INTRODUCTION

A. Purpose

The purpose of this report is to develop establishment and discontinuance criteria for automated weather observing systems (AWOS) for publication in FAA Order 7031.2B, Airway Planning Standard Number One (Reference 1). Airway Planning Standard Number One contains the policy and summarizes the criteria used in determining eligibility of terminal locations for establishment, discontinuance and improvements of air navigation facilities and air traffic control services. AWOS is intended to cost effectively automate the weather observation function at locations where weather data is currently observed, recorded and disseminated manually and to expand weather observation services to additional locations where they are not currently available or available only part-time.

B. Background

Accurate and reliable advance weather information is essential to the safety and efficiency of aviation, and surface weather observations are the most important portion of it. Weather information is needed by pilots, operators and air traffic control facilities for planning, safety and efficiency. Information concerning hazardous weather is especially needed due to the potentially serious impact these conditions may have on aircraft performance and structural integrity.

The Department of Commerce's National Weather Service (NWS) has the statutory responsibility to provide forecasts for navigation. While the NWS provides the nucleus of the basic weather observation program, the Departments of Transportation (DOT) and Defense (DOD) furnish resources to observe and record weather data at certain locations through mutual agreements. Support for civil flight operations is currently limited primarily to major airports where observations are taken by the NWS or by FAA-operated air traffic control towers (ATCT) or flight service stations (FSS). At many smaller airports where the government does not provide surface weather observation services or where the services are provided only part-time, commercial operators establish Supplementary Aviation Weather Reporting Stations (SAWRS) under NWS oversight to satisfy FAA regulations for commercial operations. SAWRS weather observations, however, are generally taken only when needed by the operator and are not routinely available to other users. Figure 1 categorizes surface weather observation stations located in the fifty United States, Puerto Rico and the Virgin Islands, as inventoried in 1981 (Reference 2).

Although the continuing growth of aviation has increased the demand for weather reports and forecasts at additional locations, the costs of labor-intensive manual weather observing systems has prohibited their expansion to additional locations. Although most manual weather observations are taken as a part-time task, the departments collectively expend over 1,000 personyears annually to provide these observations (Reference 3). Surface weather observing stations are widely separated in certain areas, affecting the accuracy and reliability of weather

FIGURE 1

Categories of Surface Weather Observation Stations*Operated By Or Under Oversight of NWS

FAA Personnel

Flight Service Stations (FSS)	216	
Air Traffic Control Towers (ATCT)	<u>161</u>	377

NWS/NWS Contract Personnel

Weather Service Forecast Offices (WSFO)	31	
Weather Service Offices (WSO)	176	
Weather Meteorological Offices (WSMO)	12	
Weather Service Contract Meteorological Offices (WSCMO)	15	
Synoptic Weather Observing Stations	15	
Contract Basic Weather Observation Stations	142	
Automatic Meteorological Observing Stations	66	
Coast Guard/Marine Reporting Stations	<u>184</u>	641

Supplementary Aviation Weather Reporting
Stations (SAWRS)

	<u>276</u>	1,294
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DOD

		<u>148</u>
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Total Surface Weather Observation Stations

		1,442
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*Source: Reference 2. Includes surface weather observation stations in the fifty United States, Puerto Rico and the Virgin Islands as inventoried in 1981. For those locations with two collocated facilities, only one facility is reflected in these counts.

forecasts in those areas. Commercial instrument flight rule (IFR) operations under Parts 121 and 135 of the Federal Aviation Regulations (FAR) are restricted at over 1,200 airports with standard instrument approach procedures because of the absence of a local weather reporting service and at approximately 376 airports where the service is provided only part-time (Reference 4). Non-commercial IFR operations conducted under FAR Part 91 are authorized at locations without a local weather reporting service, but the minimum altitude of the approach procedures at these locations is increased in relation to the distance from the remote altimeter setting source to account for potential differences in barometric pressure. Until 1976, the use of remote altimeter settings had been authorized by FAA regardless of the terrain between the runway and the remote altimeter setting source. However, a change (Reference 5) in the Terminal Instrument Procedures (TERPS) (Reference 6) prohibits the use of remote altimeter settings at airports in precipitous terrain. Based on the change, a case-by-case review of altimeter settings has resulted in the FAA disallowing IFR approaches or increasing the minima at some airports. Additionally, there have been some requests for authorization of new approach procedures which have not been approved due

to the lack of a local altimeter setting. Of 1,733 airports currently with approved standard instrument approach procedures, IFR approaches by Part 91 operators at 1,307 locations are conducted with altitude information derived from a remote source (Reference 4). Full time remote altimeter setting penalties are required at approximately 931 airports (Reference 4).

These conditions suggest a need to maintain and expand accurate and reliable weather information services at sufficient locations to meet the needs of pilots, operators and air traffic control facilities. Studies and experience have shown that automated systems can meet this need in the most cost effective manner by reducing the time devoted to weather observations at manned locations, providing a capability of taking observations at locations when facilities are closed, and expanding observation services to unmanned locations.

C. Non-Federal AWOS

There will be no takeover of AWOS purchased and installed by parties other than the Federal Government. This provision is an exception to the general policy of paragraph 10 of FAA Order 7031.2B, Airway Planning Standard Number One (Reference 1), which provides eligibility for inclusion of non-federal terminal facilities in the National Airspace System with FAA assumption of ownership, operation, maintenance and logistic support.

D. Organization of Remainder of Report

For convenience and simplicity, "automated weather observing systems" will be referred to in this report simply as "AWOS."

Chapter II summarizes the criteria developed in this report for the establishment and discontinuance of AWOS. These criteria will be published in FAA Order 7031.2B, Airway Planning Standard Number One (Reference 1).

Chapter III examines the life-cycle costs of AWOS. Because AWOS may be tailored to meet site-specific needs, especially those at non-towered airports, costs (as well as benefits) are developed modularly in this report.

Chapter IV outlines the methodology used to estimate and value AWOS benefits. AWOS benefits include enhanced safety, efficiency, and other indirect but important intangible benefits. Safety benefits result from reduced risk and incidence of accidents. Efficiency benefits result from cost avoidance realized by ATCT's and commercial operators whose weather observation functions would be replaced by AWOS, and reduced risk and incidence of flight disruptions of actual and would-be instrument approaches and overflight wind checks by visual approaches. Other benefits, which are indirect or intangible in that they are difficult to quantify and ascribe site-specifically, include benefits to departing and enroute aircraft, improved quality of weather information, contribution to the weather communications network, reduced workload of flight service stations, congestion relief at major airports and accident investigation. Additionally, proximity penalties and remoteness premiums are discussed.

Chapter V derives Phase I screening criteria for AWOS at non-towered and non-federal towered airports for publication in Airway Planning Standard Number One (Reference 1). As with the investment criteria for several other agency facilities, equipment and services, the criteria for AWOS at non-towered and non-federal towered airports are two-phased. Phase I is a set of simple, generalized criteria designed to initially identify potential establishment and discontinuance candidates. Phase II is a site-specific computerized benefit/cost screening process under which life-cycle benefits are computed by using official aviation activity forecasts to quantify the present value benefits independently for each year of a system's estimated 15-year economic life.

Chapter VI provides computer-generated listings of the results of applying the Phase I and II establishment criteria for non-towered and non-federal towered airports to over 3,100 non-towered, non-federal towered and FAA tower discontinuance candidate civil airports, based on Terminal Area Forecasts over the 15-year period Fiscal Years 1981 through 1995.

Chapter VII provides a sensitivity analysis of the assumptions used in this report which are uncertain or characterized by judgment.

Chapter VIII provides a "rough" assessment of the impact of the criteria on agency resources to comply with FAA Order 1320.1. The impact is "rough" because (1) it is presently uncertain which specific AWOS configuration will be justified for each qualifying airport, and (2) meeting candidacy levels for non-towered and non-federal towered airports will not mean automatic qualification since benefit/cost screening is but one of several inputs to the FAA decisionmaking process relative to investment in facilities and equipment.

Finally, there are included a number of appendices which support analyses described in the text and a list of references used in the preparation of this report.

CHAPTER II - SUMMARY OF ESTABLISHMENT AND DISCONTINUANCE CRITERIA

This chapter summarizes the criteria for establishment and discontinuance of AWOS as developed in this report. These criteria do not apply where the National Weather Service (NWS), its agent, or the Department of Defense currently provides surface weather observation services. These newly developed criteria will be published in FAA Order 7031.2B, Airway Planning Standard Number One (APS-1) (Reference 1). APS-1 contains the policy and summarizes the criteria used in determining eligibility of terminal locations for establishment, discontinuance and improvements of air navigation facilities and air traffic control services.

A. FAA Towered Airports

All FAA towered airports where the surface weather observation function is the responsibility of the FAA qualify for AWOS establishment, except those locations identified as tower discontinuance candidates under the provisions of Paragraph 5 of APS-1. Priority of AWOS establishment at these locations will be given to part-time facilities, followed by full-time facilities, in recognition of the relatively greater benefits of AWOS when facilities are closed. Criteria for the establishment and discontinuance of AWOS at non-federal towered airports and locations identified as tower discontinuance candidates are outlined in paragraph C below.

B. Flight Service Stations

Where an automated flight service station is obligated to take weather observations, that location qualifies for AWOS establishment. Other locations with flight service stations qualify if they satisfy either the provisions of Paragraph A or C.

C. Non-Towered and Non-Federal Towered Airports

Establishment and discontinuance criteria for AWOS at non-towered and non-federal towered airports are two-phased. Phase I criteria are simple, generalized criteria designed to initially identify potential candidates. Under Phase I a ratio value is computed by summing the benefits provided to each user class and dividing the sum by the life-cycle cost. If the ratio value obtained is equal to or greater than the thresholds specified below, the airport becomes a candidate for Phase II screening. Phase II is a site-specific computerized life-cycle benefit/cost evaluation of candidates identified in Phase I using the techniques described in this report.

1. Phase I Establishment Criteria

a. Non-Towered and Non-Federal Towered Airports With Existing Standard Instrument Approach Procedures (SIAP) Or With Prospective SIAP With AWOS

Air Carrier and Air Taxi (Lesser of (ACITN+ATITN) or (3,000)) x \$25.38 = \$xxxx

<u>General Aviation and Military</u>	<u>Per Itinerant Operation</u>	<u>Per Local Operation</u>
Wind Sensor	\$ 3.80	\$ 2.28
Temperature/Dew Point Sensors	.04	.02
Altimeter Sensor	2.16	
Ceiling and Visibility Sensors	15.43	
Precipitation Sensor (s)	.06	.04
Thunderstorm Sensor	.01	.01

(GAITN+MILITN)x\$TOTAL = xxxx

(GALCL+MILLCL)x\$TOTAL = xxxx

Phase I Value (If 1.0 or greater, location satisfies Phase I Establishment Criteria)

Total x AR
LCC

where the terms are as defined below:

ACITN, ATITN, GAITN and MILITN are the respective numbers of annual air carrier (AC), air taxi (AT), general aviation (GA) and military (MIL) itinerant operations; and GALCL and MILLCL are the respective numbers of annual general aviation (GA) and military (MIL) local operations. Operations counts may be obtained from the "Terminal Area Forecasts" (published annually by FAA-APO), the Airport Master Record (FAA Form 5010-1), the Airport Master File (maintained by FAA's National Flight Data Center), the airport manager, or any other generally accepted source. Values for these activity variables in the Phase II criteria described below will be derived from the Terminal Area Forecast Data System.

LCC is the applicable life-cycle cost from Table A below.

AR is an adjusting proximity penalty or remoteness premium reciprocal. For candidate airports located in non-precipitations terrain and less than 10 nautical miles from a full-time, non-automated FAA/NWS/NWS Contract surface weather observation station with homogeneous weather, a proximity penalty reciprocal of .50 applies. For candidate airports that are located 90 or more nautical miles from the nearest full-time, non-automated FAA/NWS/NWS Contract surface weather observation station, a remoteness premium reciprocal of 1.25 applies. The adjustment reciprocal for all other candidate airports is 1.0.

TABLE A

Life-Cycle Cost (LCC)

LCC = Fixed Cost of \$49,617 + Sum of Variable
Costs Unique to Applicable Sensing Devices*
+ \$21,535 if System has Longline Communications

*Variable Costs Unique to Sensing Devices:

Wind	\$ 1,999
Temperature/Dew Point	1,615
Altimeter	3,974
Ceiling	41,881
Visibility	28,517
Liquid Precipitation	1,367
Freezing Precipitation	3,687
Thunderstorm	23,175

b. Other Non-Towered and Non-Federal Towered Airports

Air Carrier and Air Taxi (Lesser of (ACITN+ATITN) or (3,000)) x \$25.38 = \$xxxx

<u>General Aviation and Military</u>	<u>Per Itinerant Operation</u>	<u>Per Local Operation</u>
Wind Sensor	\$ 3.80	\$ 2.28
Temperature/Dew Point Sensors	.04	.02
Altimeter Sensor	.00	
Ceiling and Visibility Sensors	.00	
Precipitation Sensor (s)	.06	.04
Thunderstorm Sensor	.01	.01

(GAITN+MILITN)x\$TOTAL = xxxx

(GALCL+MILLCL)x\$TOTAL = xxxx

Phase I Value (If 1.0 or greater, location satisfies
Phase I Establishment Criteria)

Total x AR
LCC

where the terms are as defined above in paragraph C-1-a.

2. Phase I Discontinuance Criteria

To determine whether an AWOS installation at a non-towered or non-federal towered airport meets Phase I discontinuance criteria, a ratio value is calculated by the same procedure for establishment criteria described in paragraph C-1 above. If the ratio value so obtained is less than 0.45, the system meets Phase I discontinuance criteria.

3. Phase II Criteria

Candidate airports for AWOS identified by the above criteria will be evaluated by the computerized benefit/cost subroutine developed in this report. If a benefit/cost ratio of 1.0 or greater (for establishment) or less than .45 (for discontinuance) is computed, the airport becomes a candidate. The subroutine requires the following supplemental site-specific data:

- a. System acquisition and installation costs (FAA Form 2500-40, F&E Cost Estimate Summary).
- b. Whether or not optional longline communications are proposed, and if required, the annual cost.

D. Sensor Configuration

The typical AWOS configuration includes sensors for wind direction and speed, temperature, dewpoint, altimeter, ceiling, visibility and liquid precipitation. However, AWOS installations may include additional or fewer sensors. For example, a cloud height (ceiling) sensor may not be justified at certain locations in close proximity to another observation site, while additional sensors, such as for freezing precipitation and thunderstorms, may be added if cost effective.

E. Non-Federal AWOS

There will be no takeover of AWOS purchased and installed by parties other than the Federal Government. This provision is an exception to the general policy of paragraph 10 of FAA Order 7031.2B, Airway Planning Standard Number One (Reference 1), which provides eligibility for inclusion of non-federal terminal facilities in the National Airspace System with FAA assumption of ownership, operation, maintenance and logistic support.

CHAPTER III - LIFE-CYCLE COSTS

A. Introduction

This chapter examines the life-cycle costs of AWOS at FAA towered airports and non-towered airports. Life-cycle costs are categorized into facilities and equipment (F&E) costs, which are assumed to occur at the beginning of the installation year, and recurring operations and maintenance (O&M) costs, which are assumed to occur at mid-year and are discounted (@ 10 percent) to their present value based on an assumed economic life of fifteen years. The cost analysis in this chapter is based in large part on the Automated Weather Observing System (AWOS) Cost Analysis (Reference 2), performed by Kentron International for the FAA AWOS Program Office. While the costs outlined in Reference 2 are in mixed year dollars, the costs in this analysis are denominated in 1981 dollars to be consistent with benefit valuations and costs in other parts of this report. Certain other modifications were made to the analysis from Reference 2 to adhere to standards of the Office of Management and Budget.

Figure 2 summarizes unit life-cycle cost estimates in 1981 dollars of complete AWOS installations at FAA towered airports operating 24 hours daily and non-towered airports. For purposes of this report, non-federal towered airports are treated as non-towered airports. The cost estimates in Figure 2 reflect quantity procurement of quality equipment presently or soon to be available on the commercial market. AWOS may be tailored to meet site-specific needs. For example, at a particular site, certain weather sensors may not be necessary, certain output media may not be desired, or the telephone answering device or longline communications may not be required. In recognition of this possibility, costs (as well as benefits) are developed modularly in this report. In this way, benefits can be matched with costs and a benefit/cost ratio can be easily computed for any given AWOS configuration. Figure 3 (for FAA towered airports) and Figure 4 (for non-towered airports), by categorizing costs by fixed costs (those which remain generally fixed regardless of the number of sensing devices comprising the system) and variable costs (those which vary depending upon the sensor configuration), provide the means for computing the costs of a given AWOS configuration. The costs in Figures 3 and 4 flow directly from those in Figure 2, based on the methodology explained in the following paragraphs.

B. Facilities and Equipment Costs

1. Sensors. The sensor costs are carried directly from Figure 2 to Figures 3 and 4, except that the average unit module costs for wind, temperature, dew point, visibility and precipitation signal conditioning are included.
2. Tower, Guys, Anchors.
3. Signal Conditioning. When the sensors are separated from the data processing equipment by large distances, the sensor output must be amplified by a translator or signal conditioning module. In some installations, because of the proximity and compatibility of the sensors with the processor, the signal conditioner may be omitted.

FIGURE 2

Estimated Unit Life-Cycle Costs of Complete AMOS Installations (1981 Dollars)

<u>FACILITIES AND EQUIPMENT^{1/}</u>	<u>FMA Towered Airports</u>	<u>Non-Towered Airports</u>
<u>SENSORS</u>		
Wind (Direction and Speed)	\$ 880	\$ 880
Ambient Temperature and Dew Point	470	470
Dual Altimeter Setting Sensors	2,160	2,160
Laser Cellometer	22,770	22,770
Visibility (Forward Scatter Meter)	15,300	15,300
Liquid Precipitation (Quantity)	540	540
Freezing Precipitation (Yes/No)	1,800	1,800
Thunderstorm Detection/Location	12,600	12,600
Tower, Guys, Anchors	+ 570	+ 570
	\$ 57,090	\$ 57,090
<u>SIGNAL CONDITIONING</u>		
Enclosure, Rack, Power Supply	\$ 1,210	\$ 1,210
Modules for Wind, Temperature, Dewpoint, Visibility, Precipitation	1,230	1,230
Communications Interface Module	+ 410	+ 410
	2,850	2,850
	3,440	3,440
<u>CENTRAL PROCESSOR (Including software program)</u>		
<u>OUTPUT EQUIPMENT</u>		
CRT Display	\$ 1,310	-
Teletype Printer	1,850	-
Voice Generator	1,800	\$ 1,800
Telephone Answering Device	360	360
Modem	+ 210	+ 210
	\$ 5,530	+ 2,370
<u>TOTAL EQUIPMENT COST</u>	\$ 68,910	\$ 65,750
INITIAL SPARES (@ 25% of "Total Equipment Cost")	17,230	16,440
OTHER F&E COSTS (@ 35% of "Total Equipment Cost")	+ 24,120	+ 23,010
<u>TOTAL F&E COSTS (INSTALLED)</u>	\$110,260	\$105,200
<u>OPERATIONS AND MAINTENANCE</u>		
<u>PERSONNEL</u>		
Observation	\$ 2,162	\$ 0
Maintenance	+ 712	+ 2,268
SPARES INVENTORY (@ 3% of "Total Equipment Cost")	\$ 2,874	\$ 2,268
COMMUNICATIONS (with Longline) ^{2/}	2,067	1,973
FACILITIES	2,920	2,920 ^{2/}
TOTAL ANNUAL O&M COSTS ^{3/}	+ 2,404	+ 1,888
x LIFE-CYCLE DISCOUNT FACTOR ^{4/}	\$ 10,625	\$ 9,049
<u>TOTAL LIFE-CYCLE O&M COSTS</u>	\$ 7,976	\$ 7,976
	\$ 81,874	\$ 72,175
<u>TOTAL LIFE-CYCLE COST</u>	\$192,134	\$177,375

^{1/}1982 dollars from Reference 2 discounted to 1981 dollars @ 10 percent and rounded to the nearest \$10.
 The application of a specific price index was considered unwarranted here, given the pro forma, preliminary nature of the estimates in Reference 2. Costs are denominated in 1981 dollars to be consistent with benefit valuations and costs in other parts of this report.
^{2/}Optional for non-towered airports. Related to distance.
^{3/}Source: Reference 2 (modified).
^{4/}Sum of $(1/(1+i)^n - 0.5)$ for $n = 1$ to 15, where 'i' is the OMB-prescribed discount rate of 10 percent and 'n' is each year of an assumed economic life of 15 years.

FIGURE 3

Estimated Unit Life-Cycle Costs of AMOS Installations at FAA Towered Airports (1981 Dollars)^{1/}

VARIABLE COSTS UNIQUE TO SENSING DEVICES									
	Wind (Direc- tion & Speed)	Ambient Temper- ature & Dew Point	Dual Alti- meter Set- ting Sensors	Laser Cello- meter	Visibility (Forward Scatter Meter)	Liquid Precip. (Qty.)	Freezing Precip. (Yes/No)	Thunderstorm Detection/ Location	
FACILITIES AND EQUIPMENT									
Sensor (including modules)									
Tower, Guys, Anchors		\$ 880	\$2,160	\$22,770	\$15,505	\$ 745	\$2,005	\$12,600	
Other Signal Conditioning									
Central Processor and Software Program									
Output Equipment		220	540	5,693	3,876	186	501	3,150	
Initial Spares (@ 25%)	271	+ 308	+ 756	+ 7,970	+ 5,427	+ 261	+ 702	+ 4,410	
Other P&E (@ 35%)	+ 380	\$1,408	\$3,456	\$36,433	\$24,808	\$1,192	\$3,208	\$20,160	
Total	\$1,736								
	\$1,085	\$ 880	\$2,160	\$22,770	\$15,505	\$ 745	\$2,005	\$12,600	
OPERATIONS AND MAINTENANCE									
Personnel									
Observation									
Maintenance									
Spares (@ 3%)	\$ 33	\$ 26	\$ 65	\$ 683	\$ 465	\$ 22	\$ 60	\$ 378	
Communications ^{2/}									
Facilities									
Annual Total	\$ 33	\$ 26	\$ 65	\$ 683	\$ 465	\$ 22	\$ 60	\$ 378	
x Life-Cycle Discount Factor ^{3/}	x 7.976	x 7.976	x 7.976	x 7.976	x 7.976	x 7.976	x 7.976	x 7.976	
Total	\$ 263	\$ 207	\$ 518	\$ 5,448	\$ 3,709	\$ 175	\$ 479	\$ 3,015	
	\$1,999	\$1,615	\$3,974	\$41,881	\$28,517	\$1,367	\$3,687	\$23,175	
TOTAL LIFE-CYCLE COST*									

*LIFE-CYCLE COST OF A GIVEN SYSTEM = \$85,915 + SUM OF VARIABLE COSTS UNIQUE TO APPLICABLE SENSING DEVICES

1/ Source: Reference 2 (modified).

2/ Related to distance.

3/ Sum of $(1/(1+i)^n - 0.5)$ for $n = 1$ to 15, where 'i' is the OMB-prescribed discount rate of 10 percent and 'n' is each year of an estimated economic life of 15 years.

FIGURE 4

Estimated Unit Life-Cycle Costs of ANOS Installations at Non-Towered Airports (1981 Dollars)^{1/}

VARIABLE COSTS UNIQUE TO SENSING DEVICES									
	Wind (Direc- tion & Speed)	Ambient Temper- ature & Dew Point	Dual Alti- meter Set- ting Sensors	Laser Cello- meter	Visibility (Forward Scatter Meter)	Liquid Precip. (Qty.)	Freezing Precip. (Yrs/Hr)	Thunderstorm Detection/ Location	
FIXED COSTS									
Sensor (including modules) Tower, Guys, Anchors	\$ 1,085	\$ 880	\$2,160	\$22,770	\$15,505	\$ 745	\$2,005	\$12,600	
Other Signal Conditioning Central Processor and Software Program									
Output Equipment									
Initial Spares (@ 25%)	271	220	540	5,693	3,876	186	501	3,150	
Other F&E (@ 35%)	+ 380	+ 308	+ 756	+ 7,970	+ 5,427	+ 261	+ 702	+ 4,410	
Total	\$1,736	\$1,408	\$3,456	\$36,433	\$24,808	\$1,192	\$3,208	\$20,160	
OPERATIONS AND MAINTENANCE									
Personnel									
Observation	\$ 0								
Maintenance	2,268								
Spares (@ 32%)	240	\$ 33	\$ 65	\$ 683	\$ 465	\$ 22	\$ 60	\$ 378	
Communications ^{2/}	220								
Facilities	+ 1,888								
Annual Total	\$ 4,616	\$ 26	\$ 65	\$ 683	\$ 465	\$ 22	\$ 60	\$ 378	
x Life-Cycle Discount Factor ^{3/}	x 7.976	x 7.976	x 7.976	x 7.976	x 7.976	x 7.976	x 7.976	x 7.976	
Total	\$36,817	\$ 207	\$ 518	\$ 5,448	\$ 3,709	\$ 175	\$ 479	\$ 3,015	
TOTAL LIFE-CYCLE COST*	\$49,617	\$1,999	\$3,974	\$41,881	\$28,517	\$1,367	\$3,687	\$23,175	

*LIFE-CYCLE COST OF A GIVEN SYSTEM = \$49,617 + SUM OF VARIABLE COSTS UNIQUE TO APPLICABLE SENSING DEVICES (ADD \$21,535 IF SYSTEM HAS LONGLINE COMMUNICATIONS.)

^{1/} Source: Reference 2 (modified).

^{2/} Does not include longline communications.

^{3/} Sum of $(1/(1+i)^{n-0.5})$ for $n = 1$ to 15, where 'i' is the OMB-prescribed discount rate of 10 percent and 'n' is each year of an estimated economic life of 15 years.

4. Central Processor.
5. Output Equipment. The outputs of the central data processor can be tailored. Data may be output to a digital display, to a printer, to a voice generator for voice broadcasts to airborne aircraft, to a telephone answering device (i.e., Pilot Automatic Telephone Weather Answering Service), and/or through a modem for inclusion in the National Weather Data Bank.
6. Initial Spares. When an AWOS is installed, spare parts must be available to provide for replacement or repair of malfunctioning equipment. It is assumed that adequate spares can be made available for approximately 25 percent of the "total equipment cost" (F&E costs before costs for "initial spares" and "other F&E").
7. Other F&E Costs. Other F&E costs include system design, compatibility checks, delivery, installation and testing. These costs are estimated at approximately 35 percent of "total equipment cost" (F&E costs before costs for "initial spares" and "other F&E").

C. Operations and Maintenance Costs

1. Observation Personnel.
 - a. FAA Towered Airports. Under existing manual weather observing systems at FAA towered airports, weather observations are taken by NWS personnel, by FAA air traffic control specialists as a secondary function, or in cases where there is a collocated flight service station, by flight service specialists. Recall, however, that the criteria developed in this report for FAA towered airports are applicable only to those locations where the FAA, as opposed to the NWS or its agent, is responsible for the weather observation function. AWOS relieves the workload of the personnel performing these functions by automatically observing, recording and transmitting weather information. At this writing, state-of-the-art AWOS is not capable of measuring all weather phenomena. For example, smoke, haze, dust and fog cannot be identified by commercially available sensors. Such weather data, however, can be manually entered into AWOS as specific remarks when it becomes necessary to augment the automatic observations. Since the need for these manually entered remarks is rare, it is estimated that there will be a reduction of 95 percent in the time devoted to the weather observation function once an AWOS is installed. The NWS has found that about 25 percent of one person's time on duty is required to manually observe, record and transmit the weather (per Reference 2). This factor is the average amount of time required for these functions, taking into account routinely hourly observations during periods of good weather and greater amounts of time monitoring conditions during marginal, changing and hazardous weather. This factor was checked by Reference 2 during visits to FAA facilities and appears valid. Given these

assumptions then, only 1.25 percent of the observer's time (or 18 minutes a day) is necessary to augment AWOS $((.25 \times (1-.95)) = .0125; .0125 \times 24 \text{ hrs./day} \times 60 \text{ mins./hr.} = 18 \text{ minutes})$. For an AWOS-equipped towered airport operating 24 hours daily, Figure 5 derives an estimated annual cost of weather observation personnel of \$2,162.

- b. Non-towered Airports. Since there are no weather observation personnel at non-towered airports, other than those with a flight service station, there are no costs that accrue in this category. The pilot is totally dependent upon the output of the automated system.

2. Maintenance Personnel. This analysis assumes that AWOS equipment will be maintained by government-employed maintenance specialists.

- a. FAA Towered Airports. At FAA towered airports, maintenance technicians are assumed to be on site. It is assumed that 4 days annually are required for preventive maintenance and an additional 4 days annually for unprogrammed maintenance. Assuming a GS-11/5 annual salary of \$25,486 over 9 months and \$26,710 over 3 months equates to a weighted 1981 salary of \$25,792. This salary must be adjusted by a fringe benefits overhead factor of 1.26 (per Reference 7). The annual cost of maintenance personnel for AWOS can then be calculated as:

$$(8/365) \times \$25,792 \times 1.26 = \$712$$

- b. Non-towered Airports. The above analysis for FAA towered airports is also applicable to non-towered airports, except that an allowance must be made for travel to and from remote locations. Allowing 4 person-days per year to accommodate travel time and assuming transportation and related travel costs amount to \$150 for each day of travel, the annual maintenance personnel costs for AWOS at a non-towered airport can be calculated as:

$$((12/365) \times \$25,792 \times 1.26) + (8 \times \$150) = \$2,268$$

- 3. Spares. The costs of recurring annual spares inventories parallels that for initial spares discussed above in paragraph B-6. The estimated average annual cost to repair equipment sent to a depot or manufacturer for reconditioning is assumed to be 1 percent of "total equipment cost" (F&E costs before costs for "initial spares" and "other F&E"). Replacement of those items that are not repairable is estimated at 2 percent of the "total equipment cost."
- 4. Communications. At FAA towered airports, local weather observations are normally transmitted to the Weather Message Switching Center. Weather observations at non-towered airports may or may not be of such value that they must be transmitted to and collected by the central weather data network. When this information is not essential, no longline is necessary. However, when local observations are of value to the central

FIGURE 5

Estimated Annual Cost of Weather Observation Personnel at an FAA
Towered Airport Operating 24 Hours Daily (1981 Dollars)^{1/}

(A) Annual Hours of Operation (365 x 24)			8,760
(B) Productive Hours Per Observer			
Annual Hours Available (52 x 40)		2,080	
Less: Vacations	120		
Sick Leave	40		
Holidays	88		
Training	<u>+ 20</u>	<u>- 268</u>	1,812
(C) Net Annual Personyears (A/B)			4.83
(D) Annual Supervisory Personyears			<u>+ .61</u>
(E) Total Annual Personyears (C + D)			5.44
(F) Fraction of Observer's Time Required to Augment AWOS			<u>x .0125</u>
(G) Personyears Required Annually to Augment AWOS (E x F)			.0680
(H) Average Annual Salary after Fringe Benefits ^{2/}			<u>x \$31,795</u>
(I) Annual Observation Personnel Costs (G x H)			\$ 2,162

^{1/}Source: Reference 2 (modified).

^{2/}The median 1981 salary of surface weather observation personnel, including NWS personnel, FAA controllers and FAA flight service specialists, was \$25,234. Applying a fringe benefits overhead factor of 26 percent (per Reference 7) results in an average annual salary after fringe benefits of \$31,795.

FIGURE 6

Estimated Annual AWOS Communication Costs (1981 Dollars)

	FAA Towered Airports	Non-Towered Airports	
		With Longline	Without Longline
Longline*	\$2,700	\$2,700	\$ 0
Telephone	+ 220	+ 220	+ 220
	\$2,920	\$2,920	\$ 220

*Related to distance.

weather data network, the longline is desirable. Average annual communication costs associated with AWOS are summarized in Figure 6. On a site-specific basis, longline communications costs may vary since they vary with distance.

5. Facilities.

- a. FAA Towered Airports. Facility costs of AWOS include the fair market value of the realty and the costs of utilities associated with the weather observation function. Most weather sensors are mounted outdoors, while their displays and associated electronics are housed indoors. Utility costs include those for the building and power requirements for operation of the sensors, display and associated electronics. At FAA towered airports, where the FAA is responsible for the weather observation function, it is assumed that an area 8 feet by 10 feet (80 square feet) is required to accommodate the equipment. An additional area of 10 feet by 15 feet (150 square feet) is necessary for the observer, but since only 1.25 percent of the observer's time is devoted to augmenting AWOS (as explained above), only 1.25 percent of this area (or about 2 square feet) is chargeable to the weather observation function. At an average fair rental value of \$20 per square foot, the annual cost of floor space is \$1,640 (82 square feet x \$20). Assuming utility costs of \$2 per square foot for the building and \$50 per month for operation of the sensors, display and associated electronics, the annual cost of utilities is \$764 (82 square feet x \$2) + (\$50 per month x 12 months)). Adding these charges together, annual facility costs for AWOS at an FAA towered airport total \$2,404.
- b. Non-towered Airports. At non-towered airports, total space requirements are assumed to be only 8 feet x 8 feet (64 square feet), because the CRT display and teletype printer are not installed and there is no space requirement for an observer. Assuming utility costs for operation of the sensors, display and associated electronics of \$40 per month and keeping other assumptions as for FAA towered airports, the annual facility costs for AWOS at a non-towered airport total \$1,888 ((64 square feet x \$20) + (64 square feet x \$2) + (\$40 per month x 12 months)).

D. Determining the Life-Cycle Cost of a Given System

Since the costs in the chapter are derived modularly, life-cycle costs can be easily estimated for various AWOS configurations. The life-cycle cost of a given AWOS installation can be determined from Figure 3 (for an FAA towered airport) and Figure 4 (for a non-towered airport) by summing the life-cycle fixed costs and the life-cycle variable costs unique to the applicable sensing devices.

For example, an AWOS installation at an FAA towered airport having all the sensors outlined in Figure 3 has a life-cycle cost in 1981 dollars of approximately \$192,000, computed as follows:

Fixed Costs		\$ 85,915
Variable Costs:		
Wind	\$ 1,999	
Temperature/Dew Point	1,615	
Altimeter	3,974	
Ceiling	41,881	
Visibility	28,517	
Liquid Precipitation	1,367	
Freezing Precipitation	3,687	
Thunderstorm	<u>+23,175</u>	<u>+106,215</u>
		\$192,130

An AWOS installation at a non-towered airport having all the sensors outlined in Figure 4 has life-cycle costs in 1981 dollars of approximately \$177,000 with and \$156,000 without longline communications, computed as follows:

Fixed Costs		\$ 49,617
Variable Costs:		
Wind	\$ 1,999	
Temperature/Dew Point	1,615	
Altimeter	3,974	
Ceiling	41,881	
Visibility	28,517	
Liquid Precipitation	1,367	
Freezing Precipitation	3,687	
Thunderstorm	<u>+23,175</u>	<u>+106,215</u>
		\$155,832
Longline communications, if applicable		<u>+ 21,535</u>
		\$177,367

At the date of this report, the typical AWOS configuration is initially projected by the FAA AWOS Program Office to include sensors for wind direction and speed, temperature, dew point, altimeter, ceiling, visibility and liquid precipitation. However, future configurations may include additional or fewer sensors. For example, a cloud height (ceiling) sensor may not be justified at certain locations in close proximity to another observation site, while additional sensors, such as for freezing precipitation and thunderstorms, may be added if cost effective. The life-cycle costs in 1981 dollars of the basic configuration are outlined below for FAA towered and non-towered airports:

		<u>FAA Towered Airports</u>	<u>Non-Towered Airports</u>
Fixed Costs (Includes longline communications for FAA towered airports)		\$ 85,915	\$ 49,617
Variable Costs:			
Wind	\$ 1,999		
Temperature/Dew Point	1,615		
Altimeter	3,974		
Ceiling	41,881		
Visibility	28,517		
Liquid Precipitation	<u>+ 1,367</u>	<u>+ 79,353</u>	<u>+ 79,353</u>
			\$128,970
Longline communications, if applicable		\$165,268	<u>+ 21,535</u>
			\$150,505

CHAPTER IV - ESTIMATION AND VALUATION OF AWOS BENEFITS

A. Introduction

The establishment and discontinuance criteria for AWOS at FAA towered airports are derived in this report through a cost-effectiveness analysis, while those for non-towered and non-federal towered airports are based on a conventional benefit/cost analysis. This chapter examines, in quantitative and qualitative terms, the benefit sides of these analyses. Cost-effectiveness analysis, or more specifically least-cost analysis, concentrates on identifying the least expensive way of producing a given amount of a certain output, or as applied in this report, the most cost effective means of the continued provision of weather observation services at FAA towered airports where the FAA, as opposed to the NWS or its agent, is responsible for the weather observation function. Benefit/cost analysis, as applied in this report, is a quantitative evaluation in which the life-cycle capital, operating and maintenance costs of AWOS are compared with the dollar value of the life-cycle benefits that are expected. Intuitively, benefit/cost ratios of one or more are good investments, while those of less than one are poor investments.

Part 91 of the Federal Aviation Regulations (FAR) requires that all control zones have weather observation services. Since FAA towered airports constitute control zones, weather observations are required at FAA towered airports. Most equipment presently installed in manual weather observing systems is over 20 years old and is approaching or past the end of its economic life (Reference 2). Given these regulatory and operating constraints, Section B of this chapter summarizes a life-cycle cost-effectiveness analysis of various alternative systems of observing, recording and disseminating weather data at FAA towered airports. The analysis clearly shows that AWOS is the most cost effective means of providing weather observation services at FAA towered airports.

Unlike FAA towered airports, weather observation services are not necessarily required at non-towered and non-federal towered airports. Although the continuing growth of aviation has increased the need of and demand for weather observations at additional locations, the costs of labor-intensive weather observing systems has prohibited their expansion. At many airports where the government does not provide weather observation services, commercial operators have established self-operated Supplementary Aviation Weather Reporting Stations (SAWRS) to satisfy FAR Parts 121 and 135 which require weather observations for commercial instrument flight operations. The quantifiable benefits ascribable to the establishment and operation of AWOS at non-towered and non-federal towered airports include safety and efficiency. Safety benefits, addressed in Section C-2 of this chapter, result from reduced incidence of accidents for which unfavorable winds, density altitude, low ceiling/visibility, precipitation or thunderstorms are causes and/or factors. Efficiency benefits, addressed in Section C-3, result from cost avoidance realized by SAWRS operators whose weather observation functions would be replaced by AWOS, reduced incidence of diversions and cancellations of actual and would-be instrument approaches and overflights by visual approaches. Section C-4 outlines proximity penalty

and remoteness premium provisions which compensate for close proximity to or remoteness from a full time, non-automated FAA/NWS/NWS Contract surface weather observation station.

Section D addresses other benefits of AWOS which are termed indirect or intangible because they are difficult to quantify and ascribe site-specifically. These include benefits to departing and enroute aircraft, improved quality of weather information, contribution to the weather communications network, reduced workload of flight service stations, congestion relief at major airports and accident investigation.

AWOS installations may be tailored to meet site-specific needs. Differing requirements for various non-towered and non-federal towered airports may result in establishment of different AWOS configurations. In recognition of this possibility, benefits (as well as costs) for non-towered and non-federal towered airports are developed modularly in this report to facilitate computation of the benefit/cost ratio of the tailored system proposed for the airport in question.

B. FAA Towered Airports

1. Introduction

As mentioned above, FAR Part 91 requires weather observations at FAA towered airports. Most equipment presently installed in manual weather observing systems is over 20 years old and approaching the end of or past its economic life (Reference 2). Some equipment is no longer in production and spare parts are sometimes difficult to find for others. Modern instrumentation provides easier reading with greater accuracy and less maintenance through digital displays as compared to dial instruments currently in general use. Given the state of existing weather observing systems and the regulatory requirement for weather observing services, Section B-2 justifies the regulatory requirement for weather observing systems at FAA towered airports in cost versus benefit terms and then identifies the most cost-effective system through a least-cost analysis of various alternative systems of collecting and disseminating weather data at manned weather observation stations. These alternatives range from replacing current manual weather observing systems with new manual systems to replacing them with AWOS:

a. Manual Weather Observing Systems

- (1) FAA or National Weather Service (NWS) Observers
- (2) Contract Observers. Under this option, NWS contracts with private companies or individuals, under NWS oversight, to obtain basic aviation-oriented weather observations (Contract Basic) or complete aviation weather observations (Weather Service Contract Meteorological Observatory or WSCMO).
- (3) Supplementary Aviation Weather Reporting Stations (SAWRS). At many locations where the government does not provide aviation weather observations or where the service is provided only part-time, commercial

operators establish these stations under NWS oversight to satisfy FAA regulations for commercial instrument operations. Equipment and personnel costs are borne by the commercial operator.

b. Automated Weather Observing Systems (AWOS)

Costs are analyzed in Section B-3 for each of the above manual weather observing systems. In Section B-4, the results of the analysis in Section B-3 and the AWOS costs developed earlier in Chapter III are combined and converted to their life-cycle cost equivalents. It will be shown that AWOS is the most cost effective means of providing weather observing services FAA at towered airports.

2. Justification of Weather Observation Services at FAA Towered Airports

As mentioned above, FAA towered airports are required to have weather observation services by virtue of FAR Part 91 which requires weather observations in control zones. Although there are several benefits to these requirements, they are essentially based on safety considerations. Later, in Section C of this chapter, safety benefits are derived for weather observations at non-towered and non-federal towered airports by comparing historic weather-related accident rates with weather observations and weather-related accident rates without weather observations available. This approach to quantifying safety benefits cannot be directly used for FAA towered airports, however, because FAA towered airports have historically had weather observation services. However, by making certain adjustments to the analysis for non-towered and non-federal towered airports, a baseline justification can be derived for the provision of weather observing systems at FAA towered airports.

Figure 7 derives safety benefits of weather observations per activity unit at FAA towered airports for each user class by weather phenomena by analogy with the analysis derived later in Section C of this chapter for non-towered and non-federal towered airports. To account for the impact of more landing aids and other factors which would bear on a comparison of weather-related accident rates with and without weather observations at FAA towered airports, all avertable accident rates are reduced by one third. Avertable wind-related accident rates are reduced an additional third for the air taxi user class and two thirds for the air carrier user class in consideration of their greater aircraft weight and lesser proneness to such accidents as compared to the general aviation user class. Figure 8 applies the results from Figure 7 to 1981 air traffic activity at FAA-operated ATCT's.

The foregoing assumptions were factored into this analysis to account for the historical accident rate differences at airports having many as opposed to few or no landing aids. While these assumptions should not be considered gospel, they do adequately

describe the relative differences in accident potential between these airport types. Thus, the requirement for weather observation services can be justified at FAA towered airports on the basis of safety alone. Of course there are benefits other than safety ones, but the purpose here is simply to ascertain whether or not mandatory weather observation services at FAA towered airports are economically justified. Having established that they are, the analysis now becomes one of cost effectiveness.

FIGURE 7

Extrapolated Safety Benefits of Weather Observations Per Operation at FAA Towered Airports (1981\$)

Weather Phenomenon and User Class	Cost Per Accident (\$000)		Adjusted Avertable Accident Rate ³ / x 10 ⁻⁶ Per		Benefit Per					
	Fatalities and Injuries ¹	Aircraft Damage ² /	Total	Itin. Opn.	Local Opn.	AC Itin Opn.	AT Itin Opn.	CA Itin Opn.	Local Opn.	ML Itin Opn.
Wind	\$ 892	\$2,733	\$ 3,625	.823	-	\$ 2.983				
	116	60	176	1.646	-		\$.290			
	45	24	69	2.469	1.481			\$.170	\$.102	
	70	608	678	2.469	1.481					\$1.674 \$1.004
Density Altitude	207									
	AC	2,400	2,607	.067	-	.175				
	AT	52	79	.067	-		.005			
	CA	21	31	.067	.040			.002	.001	
ML	16	530	546	.067	.040					.037 .022
Ceiling/Visibility	13,958									
	AC	5,549	19,507	.925	-	18.044				
	AT	122	1,931	.925	-		1.786	.691	-	2.157
	CA	50	747	.925	-					
ML	1,085	1,247	2,332	.925	-					
Precipitation	295									
	AC	3,330	3,625	.075	-	.272				
	AT	73	111	.075	-		.008			
	CA	30	45	.075	.045			.003	.002	
ML	23	744	767	.075	.045					.057 .035
Thunderstorms	121									
	AC	2,400	2,521	.019		.048				
	AT	52	68	.019			.001			
	CA	21	27	.019	.011			.001	.000	
ML	9	530	539	.019	.011					
						\$21.522	\$2.090	\$.867	\$0.105	-.010 \$3.935 \$1.067

1/ Probabilities of fatalities, serious injuries and minor injuries per accident (by analogy with non-towered airport analysis in Appendix A) applied to average occupant load factors by user class (per Reference 8) and unit losses in 1981 dollars of \$580,000 per statistical life, \$42,000 per statistical serious injury and \$16,000 per statistical minor injury (per Appendix B and Reference 9).

2/ Probabilities of aircraft being destroyed, substantially damaged and minorly damaged per accident (by analogy with non-towered airport analysis in Appendix A) applied to unit losses in 1981 dollars of \$7,100,000, \$157,000, \$64,000 and \$1,600,000 per destroyed aircraft, \$2,400,000, \$52,000, \$21,000 and \$530,000 per substantially damaged aircraft, and \$1,200,000, \$26,000, \$11,000 and \$265,000 per minorly damaged aircraft, for the respective user classes (per Reference 9).

3/ Drawn by analogy with analysis for non-towered and non-federal towered airports in Section C of this chapter, except that all avertable accident rates are reduced by one third to allow for the impact of landing aids and other factors at FAA towered airports which would bear on a comparison of weather-related accident rates at FAA towered airports with and without weather observations. Additionally, avertable wind-related accident rates are reduced by one third for the air taxi user class and two thirds for the air carrier user class in consideration of their greater weight and lesser proneness to such accidents.

FIGURE 8

Results of Figure 7 Applied to FY 1981 Air Traffic Activity at Airports With FAA-Operated ATCT's (1981 Dollars)^{1/}

	AC	AT	GA	ML	TOTAL	Annualized Cost ^{4/}	D/C Ratio
Mean, 431 ATCT's ^{2/}	\$ 473,782	\$ 23,646	\$57,590	\$14,604	\$ 569,622	\$65,653	8.7
Median ^{2/} , SRV	434,766	24,593	33,300	5,169	497,828	62,077	8.0
5 Busiest ATCT's ^{2/}							
ORD	11,082,409	221,406	45,672	15,567	11,365,054	76,386	148.8
ATL	11,604,124	65,996	33,388	13,561	11,717,069	76,386	153.4
LAX	8,369,884	100,855	57,975	11,577	8,540,291	76,386	111.8
DEN	6,781,302	126,533	84,802	7,142	6,999,779	76,386	91.6
DFW	7,400,964	196,475	24,498	3,050	7,624,987	76,386	99.8
5 Least Busy ATCT's ^{2/} excluding ATCT discontinuance candidates ^{3/}							
FME	0	0	2,225	78,220	80,445	62,077	1.3
KWA	10,976	2,255	1,934	67,794	82,959	62,077	1.3
GPK	131,177	1,678	34,865	1,021	168,741	76,386	2.2
JLN	98,528	125	15,881	884	115,418	62,077	1.9
ADQ	196,152	138	11,305	30,379	237,974	62,077	3.8

^{1/} Source: Reference 10; 1981 edition dated September 30, 1981.

^{2/} In terms of 1981 itinerant aircraft operations.

^{3/} As tentatively identified in Reference 11 as potential FAA ATCT discontinuance candidates.

^{4/} Derived from Figure 16 using weighted costs of manual weather observing systems with FAA, NWS, or WSCMO observation personnel: $(\$59,350 \times .13147) + (\text{Total Annual O\&M Costs} - \text{Observation Personnel Costs}) + (\text{Daily Operating Hours}/24) \times \text{Observation Personnel Costs}$. .13147 is the capital recovery factor of a uniform series over 15 periods with present value of \$1 at 10 percent.

3. Costs of Manual Weather Observing Systems

a. Introduction

As mentioned above, this analysis assumes that since most equipment presently installed in manual weather observing systems is over 20 years old and approaching the end of or past its economic life, new equipment must be scheduled to replace the old. The cost analysis in this section is tailored in large part after the Automated Weather Observing System (AWOS) Cost Analysis (Reference 2), performed by Kentron International for the FAA AWOS Program Office. While the costs outlined in Reference 2 are in mixed year dollars, the costs in the following analysis are denominated in 1981 dollars to be consistent with benefit valuations and costs in other parts of this report. Certain other modifications were made to the analysis from Reference 2 to adhere to standards of the Office of Management and Budget. Costs are categorized into those for replacement observation equipment, observation personnel, maintenance personnel, spares inventory, communications equipment and facilities.

b. Replacement Observation Equipment

Figure 9 outlines estimated observation equipment replacement costs at manned weather observing stations as they are currently structured. The equipment replacement costs outlined in Figure 9 are based on catalog or vendor estimated "off-the-shelf" prices. When appropriate, quantity discounts are taken into account. Installation costs are conservatively estimated in that they are based only on the removal of the old equipment and acquisition of and replacement with the new. Existing cables, wires, supporting structure, etc. are assumed not to require replacement. It is also assumed that transportation charges can be absorbed within the estimates made. Note that NWS-approved equipment at SAWRS facilities, as they currently exist, is far less sophisticated than that installed at FAA and NWS sites. Through austere, this equipment provides the SAWRS operator with an approved capability for obtaining necessary weather observation coverage for his operations. Equipment and personnel costs are borne by the SAWRS operator.

c. Weather Observation Personnel

Figure 10 outlines calculations of the estimated annual costs of observation personnel for manual weather observing stations operating 8, 16 and 24 hours per day.

As discussed earlier in Chapter II, the NWS has found that, on average, about 25 percent of one person's time on duty is required to manually observe, record and transmit the weather at airport locations with FAA or NWS observation personnel. This factor is the average amount of time required for these functions, taking into account routinely hourly observations taken during periods of good weather and greater amounts of time monitoring conditions during periods of marginal, changing and hazardous weather. This factor was checked by Reference 2 during visits to FAA facilities and appears valid.

FIGURE 9

Estimated Weather Observation Equipment
Replacement Costs (1981 Dollars)^{1/}

FAA, NWS and WSCMO Stations (except SAWRS-only stations)

Wind Direction and Speed	\$ 1,090
Ambient Temperature and Dew Point	610
Dual Altimeter Setting Indicators	2,300
Laser Ceilometer	22,950
Visibility	15,750
Liquid Precipitation Quantity	540
Signal Conditioning Equipment ^{2/}	2,430
Display Terminal	+ 1,810
	<u>\$47,480</u>

Contract Basic Stations

Wind Direction and Speed	\$ 1,090
Ambient Temperature and Dew Point	610
Station Pressure	840
Liquid Precipitation Quantity	540
Signal Conditioning Equipment ^{2/}	2,430
Display Terminal	+ 1,220
	<u>\$ 6,730</u>

SAWRS-Only Stations

Wind Direction and Speed	\$ 810
Ambient Temperature and Dew Point	50
Altimeter Setting Indicator	230
Sight Clinometer and Ceiling Light	+ 810
	<u>\$ 1,900</u>

^{1/}1982 dollars from Reference 2 discounted to 1981 dollars @ 10 percent and rounded to the nearest \$10. The application of a specific price index was considered unwarranted here, given the pro forma, preliminary nature of the cost estimates in Reference 2.

^{2/}Required for new types of sensors.

FIGURE 10

Estimated Annual Costs of Observation Personnel for Manual Weather Observing Systems (1981 Dollars) 1/

24 Hour Per Day Facility	FAA		NWS		SAWS
	ATCF	FSS	Observer	MS/CMO	Contract Basic
(A) Annual Hrs. of Opn. (365 x 24)	8,760	8,760	8,760	-	8,760
(B) Productive Hrs. Per Observer Annual Hrs. Available (52 x 40) Less: Vacations, Sick Leave, Holidays and Training Net Productive Hours	2,080 - 268 1,812	2,080 - 268 1,812	2,080 - 268 1,812	-	2,080 - 228 1,852
(C) Net Annual Personyears (A/B)	4.83	4.83	4.83	-	4.73
(D) Annual Supervisory Personyears 2/	+ .61	+ .61	+ .61	-	+ .32
(E) Total Annual Personyears (C + D)	5.44	5.44	5.44	-	5.05
(F) Fraction of Time Devoted to WX Observation Function	x .25	x .25	x .25	-	x .25
(G) Productive Personyears for Weather Observation Function (E x F)	1.36	1.36	1.36	-	1.26
(H) Average Annual Salary after Fringe Benefits	\$38,948 3/	\$29,577 4/	\$26,859 5/		\$16,800
(I) Annual Personnel Costs (G x H)	\$52,969	\$40,225	\$36,528	\$84,300	\$21,168
16 Hour Per Day Facility	\$35,313	\$26,817	\$24,352	\$56,200	\$14,112
8 Hour Per Day Facility	\$17,656	\$13,408	\$12,176	\$28,100	\$ 7,056

1/Source: Reference 2 (modified). While Reference 2 used a 30 percent fringe benefits overhead factor for government observers, this analysis (as indicated below) uses a 26 percent factor to be consistent with OMB guidelines (Reference 7).

2/Ratio of supervisors to employees assumed to be approximately 1:8 for FAA and NWS and 1:15 for SAWS.

3/Weighted GS-12/5 1981 salary of \$30,911 x 1.26 fringe benefits overhead factor (per Reference 7) = \$38,948

4/Weighted GS-10/5 1981 salary of \$23,474 x 1.26 fringe benefits overhead factor (per Reference 7) = \$29,577

5/Weighted GS-9/5 1981 salary of \$21,317 x 1.26 fringe benefits overhead factor (per Reference 7) = \$26,859

6/\$2.00 per hourly observation x 24 hours per day x 365 days per year = \$17,520.

Under WSCMD contracts, under which complete aviation weather observations are provided, payment is based on the manpower necessary to fulfill the contractual requirements. The average cost of WSCMD contracts was \$88,500 in FY 1982 per Reference 2. Contract Basic agreements provide payment for each hourly weather observation taken. Special observations are not normally taken. The NWS has calculated the average cost of such contracts to be \$1.90 per observation (1980 dollars) per Reference 2. As mentioned earlier, the mixed dollar values in Reference 2 have been converted to and denominated in 1981 dollars in this section to be consistent with benefit valuations and costs in other parts of this report. At a conservative annual rate of increase in personnel costs of 5 percent, the costs cited above for WSCMD and Contract Basic agreements can be restated in 1981 dollars as approximately \$84,300 per year and \$2.00 per observation, respectively.

The primary job responsibility of SAWRS personnel usually is that of company dispatcher and ground handling of aircraft, passengers and crew. Consequently, the weather observation function is a secondary, although necessary, function. It is assumed that 25 percent of the salaries of SAWRS personnel is attributable to the weather observation function. SAWRS personnel costs are borne by the operator, while training of personnel is provided by the NWS.

d. Maintenance Personnel

Three levels of maintenance are performed at the observing site: preventive maintenance, repair on-site, and remove/replace/send away for depot or manufacturer repair. Preventive maintenance, which is performed on a periodic schedule, includes operations functional checks, calibration, lens cleaning, etc. On-site repairs include those actions within the capabilities of the local maintenance. Problems which cannot be solved by the local maintenance facility are resolved by replacement and shipping the defective equipment to a depot or manufacturer.

Figures 11 and 12 summarize the annualized cost of maintenance personnel (in 1981 dollars) for manual weather observing systems. Maintenance personnel at weather observing stations are responsible for other, non-weather related equipment also. As an estimate of the maintenance manpower required to maintain existing government manual weather observing systems, this analysis rests on the NWS standard that, on average, approximately 36 percent of technicians' time is devoted to weather equipment (Reference 12 as cited by Reference 2). The NWS standard does not differentiate between a one, two or three shift operation. Maintenance personnel costs under WSCMD contracts are assumed to be the same as NWS locations. Because of the equipment simplicity typical of Contract Basic stations, maintenance manpower costs at these sites are assumed to be half of those at NWS stations. Maintenance of weather equipment installed at SAWRS locations is generally accomplished by the operator or by a maintenance technician under contract.

e. Spares Inventory

Spares inventory costs include those of the local spares inventory, spares inventory at higher echelons in the supply system, the maintenance costs at the depot or manufacturer to restore malfunctioning equipment to operational status, and the cost of replacing irreparable equipment.

FIGURE 11

Personyears Devoted Annually to Maintain FAA/NWS/WSCMO
Manual Weather Observing Systems^{1/}

	<u>FAA/NWS/WSCMO</u>
(A) Annual Work Hours (365 x 8)	2,920
(B) Productive Hrs. per Technician Annual Hrs. Available (52 x 40)	2,080
Less: Vacations, Sick Leave, Holidays and Training	- 268
Net Productive Hours	<u>1,812</u>
(C) Net Annual Personyears (A/B)	1.61
(D) Annual Supervisory Personyears ^{2/}	<u>+ .20</u>
(E) Total Annual Personyears (C + D)	1.81
(F) Fraction of Time Devoted to Weather Observation Equipment ^{3/}	<u>x .36</u>
(G) Personyears Devoted Annually to Weather Observation Equipment (E x F)	.65

^{1/}Source: Reference 2 (modified).

^{2/}Assumes ratio of supervisors to employees of approximately 1:8.

^{3/}See text.

FIGURE 12

Annual Costs of Maintenance Personnel for Manual
Weather Observing Systems (1981 Dollars)^{1/}

	<u>FAA/NWS/WSCMO</u>	<u>Contract Basic</u>	<u>SAWS</u>
Personyears Devoted Annually to Weather Observation Equipment	.65 ^{2/}		
Average Annual Salary after Fringe Benefits	<u>x32,498^{3/}</u>		
Annual Maintenance Personnel Costs	\$21,124	\$10,562	\$300

^{1/} Source: Reference 2 (modified).

^{2/} From Figure 11.

^{3/} weighted 1981 salary of \$25,792 x 1.26 fringe benefits overhead factor =
\$32,498.

Keeping with the assumption that most present manual weather observing systems are approaching the end of or past their economic lives and must be replaced, the costs of existing spares inventories for these systems are sunk. The cost of establishing an initial spares pool for new manual observing systems is estimated at 25 percent of the cost of the new replacement equipment. As time passes, this pool must be replenished as spares are used to return equipment to operating status. It is estimated that the average annual cost to repair equipment that is annually returned to a depot or manufacturer for reconditioning is 4 percent of the total equipment replacement cost. Further, the average annual cost of equipment that must be procured as replacement for equipment that is no longer repairable is estimated at 8 percent of the total equipment replacement cost. Based on these assumptions, Figure 13 summarizes the estimated costs of establishing the initial spares pool and annual repair and replacement costs.

FIGURE 13

Estimated Spares Inventory Costs for Manual Weather
Observing Systems (1981 Dollars)*

	<u>FAA, NWS and WSCMO Stations (Except SAWRS-Only)</u>	<u>Contract Basic</u>	<u>SAWRS- Only Sites</u>
Initial Spares Costs (@ 25%)	\$11,870	\$1,683	\$ 475
Annual Spares Replenishment Costs			
Repair Cost (@ 4%)	\$ 1,899	\$ 269	\$ 76
Replacement Cost (@ 8%)	+ 3,798	+ 538	+ 152
Total	\$ 5,697	\$ 807	\$ 228

*Source: Reference 2 (modified).

f. Communications

At FAA towered airports, surface weather data is observed, recorded, communicated to local users, and inputed to the central weather data network for dissemination to other users. Annual communications costs allocable to the weather observation function are shown by station type in Figure 14. At FAA ATCT's and SAWRS locations, weather data is relayed by telephone or electrowriter to the designated FSS for input into the weather data network. Because the communications costs for the weather observing function are small for these facilities, a conservative approach is taken in this analysis of not charging or allocating any communication costs to the weather observation function at these facilities. The standard installation at the majority of FSS's is the Western Union leased Service A which includes maintenance of equipment and circuits. Because communications include not only distributing local weather observations but also receiving weather briefing information (observations, forecasts and NOTAMS) from other stations, only 10 percent of the annual communication costs of FSS's is charged to the weather

observation function in this analysis. At NWS locations, those with NWS observers or NWS contract observers, communications circuits are commercially leased. Since the NWS longline is used exclusively to transmit weather observations from these stations, 100 percent of the annual cost can be charged to the weather observation function.

FIGURE 14

Estimated Annual Communications Costs Allocable to Manual Weather Observing Systems (1981 Dollars)^{1/}

	<u>ATCT</u>	<u>FSS</u>	<u>NWS Observer/NWS Contract Observer</u>	<u>SAWRS</u>
Longline ^{2/}		\$270	\$2,700	
Telephone/Processor/ Electrowriter		+216	216	
Maintenance			1,260	
Spares			+ 90	
Total	\$ 0	\$486	\$4,266	\$ 0

^{1/} 1982 dollars from Reference 2 discounted to 1981 dollars @ 10 percent. The application of a specific price index was considered unwarranted here, given the pro forma, preliminary nature of the estimates in Reference 2.

^{2/} Related distance.

9. Facilities

The discussion of facility costs for manual weather observing systems parallels closely with those discussed in Chapter 3 for AWOS. Facility costs include the fair market value of the realty and the costs of utilities associated with the weather observation function. While most weather sensors are mounted outdoors, their associated electronics and displays are housed indoors. Utility costs include those for the building and power requirements for operation of the sensors, display and associated electronics.

At stations with FAA, NWS or NWS contract observers (except Contract Basic stations), it is assumed that an area of 8 feet by 10 feet (80 square feet) is required to accommodate the equipment. An additional area of 10 feet by 15 feet (150 square feet) is necessary for the observer, but since only 25 percent of the observer's time is devoted to the weather observation function, only 25 percent, or approximately 37 square feet, of this floor area is chargeable to the weather observation function. The total area required is then 117 square feet. A fair market value of \$20 per square foot is assumed. Annual utility costs for the building are estimated at \$2 per square foot and those for operation of the sensors, display and associated electronics are estimated at \$30 per month. At SAWRS and Contract Basic stations, which typically have less equipment, space requirements are assumed to be 8 feet by 6 feet (48 square feet) for the equipment and 25 percent of an area 8 feet by 10 feet (or 20 square feet) for the observer, or a total of 68 square feet. The fair market rental value and annual utility costs for these facilities per square foot is assumed to be the same as those

sites above with FAA, NWS or NWS contract observers, but the costs of power requirements for operation of the sensors, display and associated electronics is assumed to be \$20 monthly. Based on these assumptions, Figure 15 summarizes the facility costs for each of the various manual weather observation alternatives.

4. Summary

Figure 16 summarizes the analysis in this section by deriving unit life-cycle costs for each of the manual weather observation alternatives discussed. By further displaying the life-cycle cost of AWOS, as derived in Chapter III, Figure 16 provides a summarized cost comparison of alternatives for providing weather observation services at manned stations. The acceptable manual weather observing system options at locations with an active ATCT are those with either FAA, NWS personnel, or full-time WSCMO contract personnel taking observations. The Contract Basic option is not an acceptable alternative because its relatively lower cost is based only on limited weather observation coverage and does not reflect transmission of current weather observations to inbound aircraft. The exclusive use of SAWRS at an active ATCT is not considered an acceptable alternative since their weather observations, under current practice, are not always available to other users of the airport. Although these limitations could conceivably be overcome by contractual negotiation and higher costs, the life-cycle costs of these alternatives even with these limitations are greater than those of AWOS.

Figure 16 clearly shows that the life-cycle cost of AWOS at an airport with an active FAA ATCT is less than the life-cycle costs of any of the manual weather observing systems currently in use at manned stations. Additionally, the life-cycle cost of AWOS is less than the costs of manual systems when observations are recorded by personnel at an FSS station. The weighted average life-cycle cost of manual weather observing systems acceptable at locations with an active ATCT is nearly 4 times that for AWOS, a margin which makes AWOS cost effective even at the least active of part-time ATCT's. The comparative advantage of AWOS is even greater when considering that AWOS, when supplemented by controller input for present weather, provides at least as much and usually more service than manual weather observing systems. Therefore, locations with an active FAA ATCT where the surface weather observation function is the responsibility of the FAA automatically qualify for AWOS. Priority of AWOS establishment at these locations will be given to part-time facilities, followed by full-time facilities, in recognition of the relatively greater benefits of AWOS when facilities are closed. AWOS investment criteria for non-federal towered airports and locations that are identified as tower discontinuance candidates will be that used for non-towered airports, as developed in Section C of this chapter and summarized in Chapter II of this report.

The cost of weather observation personnel is by far the greatest single component of the life-cycle cost of each of the various manual weather observing systems. Analysis of Figure 16 shows that for the acceptable manual weather observing systems at FAA towered airports, the weighted life-cycle cost of weather observation personnel represents approximately 55 percent of the weighted total life-cycle cost. Given this materiality, the issue and nature of the costs of weather observation personnel needs to be further scrutinized.

"Cost savings" may be visualized from two perspectives--direct cost savings and efficiency gains. "Direct cost savings," as the name

FIGURE 15

Annual Facility Costs Associated With Manual Weather Observation Functions (1981 Dollars)*

	<u>FAA and NWS Observation Stations (Except Contract Basic Stations)</u>		<u>SAWS and Contract Basic Stations</u>	
Building:				
Equipment Space (Sq. Ft.)	80		48	
Observer Space	150		80	
Fraction of Time Devoted to Wx. Obs. Function	x.25	+ 37	x.25	+ 20
Total Space Requirement		117		68
Assumed Fair Rental Value/Square Foot		x 20		x 20
		\$2,340		\$1,360
Utilities:				
Equipment Space	117		68	
Utility Cost/Square Foot	x 2	234	x 2	136
Power for Sensors, Display and Associated Electronics		+ 360		+ 240
Total		\$2,934		\$1,736

*Source: Reference 2 (modified).

FIGURE 16

**Summary of Unit Life-Cycle Costs of Weather Observing
Systems at Manned Stations Operating 24 Hours Daily (1981 Dollars)**

Facilities and Equipment	Automated System/ Initial Spares Total	Manual Systems					Non-Govt.
		FNA		NWS		Contract	
		ATCT	FSS	Observer	WECMO		
Equipment (Other than Initial Spares)	\$ 73,312	\$ 47,480	\$ 47,480	\$ 47,480	\$ 47,480	\$ 6,730	\$ 1,900
Initial Spares	+ 13,576	+ 11,870	+ 11,870	+ 11,870	+ 11,870	+ 1,683	+ 475
Total	\$ 86,888	\$ 59,350	\$ 59,350	\$ 59,350	\$ 59,350	\$ 8,413	\$ 2,375
<u>Operations and Maintenance</u>							
<u>Personnel:</u>							
Observation	\$ 2,162	\$ 52,969	\$ 40,225	\$ 36,528	\$ 84,300	\$ 17,520	\$ 21,168
Maintenance	712	21,124	21,124	21,124	21,124	10,562	300
Spares Inventory	1,629	5,697	5,697	5,697	5,697	807	228
Communications	2,920	0	486	4,266	4,266	4,266	0
Facilities	2,404	+ 2,934	+ 2,934	+ 2,934	+ 2,934	+ 1,736	+ 1,736
Total (Annual)	\$ 9,827	\$ 82,724	\$ 70,466	\$ 70,549	\$118,321	\$ 34,945	\$ 23,432
x Life-Cycle Discount Factor 2/ Total (15 Years)	\$ 78,380	x 7,976	x 7,976	x 7,976	x 7,976	x 7,976	x 7,976
Total Life-Cycle Cost	\$165,268	\$559,807	\$562,037	\$562,699	\$943,728	\$278,721	\$186,894
Relative Population of Acceptable Alternatives		\$719,157	\$621,387	\$622,049	\$1,003,078	\$287,134	\$189,269
Contribution to Weighted Total		x .25	x .36	x .37	x .02		
Weighted Total		\$179,789	\$223,699	\$230,158	\$ 20,062		
<u>Typical Parameters</u>							
Wind Direction and Speed	X	X	X	X	X	X	X
Ambient Temperature and Dew Point	X	X	X	X	X	X	X
Altimeter:							
Dual Altimeter Setting Indicators	X	X	X	X	X		
Altimeter Setting Indicator							
Station Pressure							
Visibility							
Ceiling:							
Laser Cellometer	X	X	X	X	X	X	
Sight Clinometer & Ceiling Light	X	X	X	X	X		
Liquid Precipitation Quantity	X	X	X	X	X		
Signal Conditioning Equipment	X	X	X	X	X		
Display Terminal	X	X	X	X	X		

1/From Figures 2 and 3, after omitting costs associated with sensors for freezing precipitation and thunderstorm detection/location. Freezing precipitation and thunderstorm sensors are not envisioned to be included with initially implemented AWS installations. Controller input for these and other present weather data are included in the cost of observation personnel.

implies, are where actual dollar outlays are reduced with output levels remaining at least constant. Conceptually, or theoretically, direct dollars savings can be realized through reduced staffing levels by replacing labor intensive manual weather observing systems with AWOS. Practically, however, human resources in the short-term are not as interchangeable and substitutable as other factors of production such as equipment and material. This constraint, however, is only short term. In the long-run all costs of production or output are variable. If cost savings are not desired in the direct sense by realizing actual reductions in dollars outlays, cost savings may be realized through "efficiency gains" in which output levels achievable with existing resources increase but actual costs remain constant. With reduced workload, resources can be shifted away from the weather observation function to other activities, thus increasing productivity. Theoretically, this gain should be measured by the opportunity value of the additional output or productivity which can now be realized.

Notwithstanding these "theoretical" considerations, arguments may be postulated from a "practical" sense that cloud the issue on whether or not observer cost savings should be recognized. In cases where FAA controllers perform the weather observation function, it may be argued that since staffing standards are based on peak activity periods and since weather observations are a secondary controller function and normally taken on a time-permitting basis during off-peak periods, any time savings afforded by AWOS has few if any productive alternative uses. In other words, direct cost savings may not be actually achieved since the weather observation function of controllers is only part-time and human resources aren't divisible (ignoring part-time employment), and efficiency gains aren't really achieved since the relatively small number of controller personhours released from the weather observation function wouldn't necessarily be used in a marginally productive manner (i.e., the released time may be productively idle if it is not actually channeled to additional time spent actually observing and controlling traffic). In cases where NWS personnel, NWS contract personnel or FSS personnel perform the weather observation function, these arguments are not as valid because the weather observation function in these cases is a primary rather than secondary function.

On the other hand, it can be argued that during periods of marginal, changing and hazardous weather, weather conditions must be monitored even during busy periods and, therefore, time is taken away from the primary function of controlling traffic.

Aside from the above arguments for and against the recognition of observer cost savings, AWOS can still be shown to be the most cost effective means of providing weather observation services at FAA towered airports on the basis of other cost savings. Figure 17 presents the life-cycle costs other than those for observation personnel for all of the acceptable weather system alternatives. Excluding all costs of observation personnel, the life-cycle cost of AWOS is only 48 percent of the weighted life-cycle cost of the acceptable manual weather observing systems! Even by including costs of observation personnel for AWOS and excluding them for the acceptable manual systems, AWOS still remains less costly.

Since the unit costs used to develop life-cycle costs of AWOS in this report are preliminary estimates, Chapter VII provides a sensitivity analysis of the key assumptions used in this analysis.

FIGURE 17

Unit Life-Cycle Costs of Acceptable Weather Observing Systems at Manned Stations
Operating 24 Hours Daily Reduced by Life-Cycle Costs of Weather Observation Personnel (1981 Dollars)*

	Automated System	FAA		NWS	
		ATCT	FSS	Observer	WSMO
Facilities and Equipment	\$ 86,888	\$ 59,350	\$ 59,350	\$ 59,350	\$ 59,350
Operations and Maintenance					
Total Annual O&M	\$ 9,827	\$ 82,724	\$ 70,466	\$ 70,549	\$118,321
Less Observation Personnel	- 2,162	-52,969	-40,225	-36,528	-84,300
Difference	\$ 7,665	\$ 29,755	\$ 30,241	\$ 34,021	\$ 34,021
x Life-Cycle Discount Factor	x 7.976	x 7.976	x 7.976	x 7.976	x 7.976
O&M Less Observ. Personnel	\$ 61,136	\$237,326	\$241,202	\$271,351	\$271,351
Total Life Cycle Cost Less Observation Personnel	\$148,024	\$296,676	\$300,552	\$330,701	\$330,701
Contribution to Weighted Total		x .25	x .36	x .37	x .02
		\$ 74,169	\$108,199	\$122,359	\$ 6,614
Weighted Total		\$311,341			

*From Figure 16.

C. Non-Towered and Non-Federal Towered Airports

1. Introduction

Turning now from FAA towered airports to non-towered and non-federal airports, the analysis becomes one based on benefit/cost considerations rather than cost-effectiveness because weather observation services aren't necessarily and universally required or justified at non-towered and non-federal towered airports. In other words, the question becomes not one of identifying the most cost effective means of providing weather observations but rather whether to do so at all. This section explains the nature and quantitative valuation of the benefits of AWOS at non-towered and non-federal towered airports. The corresponding costs were discussed earlier in Chapter III. Safety benefits, addressed in Section C-2, result from reduced risk and incidence of accidents for which unfavorable winds, density altitude, low ceiling and/or visibility, or precipitation are causes and/or factors. Efficiency benefits, addressed in Section C-3, result from cost avoidance realized by commercial operators whose weather observation function would be replaced with AWOS, reduced risk and incidence of diversions and cancellations of actual and would-be instrument approaches and overflights by visual approaches. Section C-4 outlines proximity penalty and remoteness premium provisions which compensate for close proximity to or remoteness from a full-time, non-automated FAA/NWS/NWS Contract surface weather observation station.

2. Safety Benefits

a. Air Carrier and Air Taxi

FAR Parts 121 (for air carrier) and 135 (for air taxi) require an approved weather observation service for commercial instrument flight operations. When a Part 121 or 135 operator desires to serve an airport for which neither the FAA or the NWS have regular weather observation service or serve it during hours when the service is unavailable, operators often resort to self-operated Supplementary Aviation Weather Reporting Stations (SAWRS). An AWOS installed at an airport which theretofore had a SAWRS would result in cost avoidance to the operator since the need for SAWRS would be eliminated. This cost avoidance is the basis upon which benefits are ascribed to these user classes in this report. While SAWRS benefits lie in both the safety and flight efficiency areas, cost avoidance is an efficiency benefit and further discussion of it is deferred to Section C-3 of this chapter along with other efficiency benefits of AWOS.

b. General Aviation

(1) Introduction

The approach taken in this safety benefits assessment of AWOS for general aviation at non-towered and non-federal towered airports is (1) to isolate the number, nature and severity of historic accidents which could have been prevented if the pilots involved had prior or improved knowledge of the weather, and (2) to compute the total costs and the per activity unit costs or losses associated with these accidents, or conversely, the total and per activity unit benefits of preventing such accidents. Before addressing the accident analysis in detail, a brief statistical background of total weather-related general aviation accidents is provided to enable the reader to picture avertable general aviation accidents in their proper perspective.

In the years from 1970 through 1979, the numbers of total and fatal general aviation accidents and the numbers of total and fatal general aviation accidents involving weather have remained somewhat constant. The accident rates per operation and per hour flown, however, have decreased with increasing aviation activity over time. Figures 18 and 19 illustrate these trends.

Figure 20 highlights the most common types of weather phenomena attributed by NTSB as being causes or factors in weather-related general aviation accidents from 1975 through 1979. It is noted that unfavorable wind conditions were cited both as a cause and a factor more often than was any other weather phenomenon.

(2) Accident Analysis

To estimate the number of accidents which might be prevented by AWOS at non-towered and non-federal towered airports, this analysis compares the historic weather-related accident rate where there were no weather observations with that where there were observations. This comparison was made by examining NTSB briefs of all U.S. general aviation accidents involving weather as a cause and/or factor that occurred in calendar year 1979 in either the approach or landing phases of operation. This examination was made by a group of experienced pilots from FAA-APO-230 and Kentron International, Inc. For each accident brief, the group ascertained whether the existence of state-of-the-art AWOS sensing devices would or would not have probably prevented the accident. Each of the above underscored parameters is discussed below in further detail.

First, general aviation accidents for which weather was cited as either a cause or a factor, or both, were taken into account in this safety benefits analysis. In addressing probable cause(s) of an accident, the NTSB considers all facts, conditions and circumstances. The object is to ascertain those cause-effect relationships in the accident sequence about which something can be done to prevent recurrence of the type of accident under consideration. The term "factor" is used, in general, to denote those elements of an accident which further explain or supplement the probable cause(s).^{*} Referring back to Figure 20, it is observed that all weather cause citations combined from 1975 through 1979 accounted for only 1.31 percent of the total causes cited for that period. In contrast, weather-related factors were cited with great regularity in general aviation accidents--they accounted for 31.5 percent of all factor citations. One possible explanation for this higher rate is the inability to determine exactly what part weather plays in an accident. That is to say that investigators may, with great regularity, suspect

^{*}Probable Cause(s) - "Condition(s) and/or event(s), or the collective sequence of conditions and/or events that most probably caused the accident to occur. Had the conditions and/or events been omitted from the sequence the accident would not have occurred" (NTSB).

Factor(s) - "Related condition(s) or event(s) which existed or occurred coincident with the condition(s) and/or event(s) that most probably caused an accident but which may or may not contributed significantly to the accident. The omission of factor(s) from the occurrence would not necessarily have prevented the accident" (NTSB).

FIGURE 18

General Aviation Accidents, 1970-1979

Year	GA Acti- vity (Millions)			Total GA Accidents			Fatal GA Accidents			
	Ops. 1/ Flown2/	Hours	No.3/	Accident Rate		No.3/	Accident Rate		Fatalities	
				Per Mil- lion Ops.	Per Mil- lion Hrs.		Per Mil- lion Ops.	Per Mil- lion Hrs.	No. 3/	No. 3/ Per Accident
1970	113.3	26.030	4,712	41.584/	180.984/	641	5.654/	24.594/	1,310	2.04
1971	109.7	25.512	4,648	42.37	182.19	661	6.03	25.91	1,355	2.05
1972	118.6	26.974	4,256	35.864/	157.674/	695	5.834/	25.654/	1,4265/	2.05
1973	122.2	29.974	4,255	34.804/	141.894/	723	5.904/	24.054/	1,412	1.95
1974	126.8	31.413	4,425	34.884/	140.804/	729	5.734/	23.144/	1,438	1.97
1975	134.2	32.024	4,237	31.564/	132.244/	675	5.014/	21.024/	1,345	1.99
1976	138.5	33.922	4,193	30.254/	123.494/	695	4.994/	20.374/	1,320	1.90
1977	142.8	35.792	4,286	30.004/	119.784/	702	4.914/	19.594/	1,436	2.05
1978	147.0	39.409	4,494	26.984/	113.984/	793	4.754/	20.074/	1,7705/	2.23
1979	151.3	43.340	4,023	26.59	92.82	678	4.48	15.64	1,367	2.02
Mean	130.4	32.439	4,353	33.494/	138.58	699	5.334/	22.00	1,418	2.03
Std. Dev.	-	-	214	5.484/	28.68	42	0.56	3.24	132	0.09
Annual Rate of Change	.0327	.0583	-.0174	-.0485	-.0715	-.0063	-.0255	-.0490	.0047	-.0011

1/Source: Reference 13.

2/Source: References 14 and 15.

3/Source: Reference 16. Data represents latest revisions. Except for 1979, accident totals exclude all U.S. registered aircraft accidents on foreign soil.

4/Suicide/sabotage accidents included in all computations except accident rates (1970-1, 1972-3, 1973-2, 1974-2, 1975-2, 1976-4, 1977-1, 1978-2).

5/Includes air carrier fatalities (1972-5, 1978-142) when in collision with general aviation aircraft.

FIGURE 19

General Aviation Weather-Related Accidents, 1970-1979

Year	GA Activity (Millions) Aircraft Hours Ops. 1/ Flom 2/	Total GA Accidents	Fatal GA Accidents		
		No. 3/	Per Mil- lion Ops.	Accident Rate Per Mil- lion Hrs.	Fatalities No. 3/ Per Accident
1970	113.3 26.030	1,026	9.06	39.42	244 588 2.41
1971	109.7 25.512	959	8.74	37.59	255 597 2.34
1972	118.6 26.974	974	8.21	36.11	285 685 2.40
1973	122.2 29.974	967	7.91	32.26	278 619 2.23
1974	126.8 31.413	1,014	8.00	32.28	302 702 2.32
1975	134.2 32.024	1,005	7.49	31.88	287 645 2.25
1976	138.5 33.922	908	6.56	26.77	262 601 2.29
1977	142.8 35.792	952	6.67	26.60	258 608 2.36
1978	147.0 39.409	928	6.31	23.55	322 759 2.36
1979	151.3 43.340	881	5.82	20.35	276 620 2.25
Mean	130.4 32.439	961	7.48	30.68	277 642 2.32
Std. Dev.	- -	47	1.09	6.23	24 56 .06
Annual Rate of Change	.0327 .0583	.0168	-.0480	-.0708	.0138 -.0420 -.0059 -.0076

1/Source: Reference 13.

2/Source: References 14 and 15.

3/Source: Reference 17. Data represents latest revisions.

FIGURE 20

Weather Phenomena as a Cause/Factor in Weather-Related Accidents, U.S. General Aviation, 1975-1979*

Weather Phenomenon	1975		1976		1977		1978		1979		Total, 1975-1979			
	C	F	C	F	C	F	C	F	C	F	C	F	A	A
Low ceiling		222	2	199	2	196	1	241	1	235	6	1.27	1,093	22.30
Rain		85		76		93		98		89			441	9.00
Fog	2	168	3	146	2	161	1	172		179	7	1.48	826	16.85
Snow		53	1	46		37	1	61		52	2	.42	249	5.08
Hail		2		2	1	2		1	1		2	.42	7	.14
Icing conditions—includes aleet, freezing rain, etc.	5	47	5	38	1	31	3	46	3	46	17	3.60	208	4.24
Conditions conducive to carb/induction system icing	2	77		58		60		53		58	2	.42	306	6.24
Unfavorable wind conditions	63	258	65	254	31	283	24	275	18	260	201	42.58	330	6.73
Wind shear	3	2	9	3	5	7		8	1	13	18	3.81	33	.67
Sudden windshift	12	22	10	11	15	20	7	13	7	15	51	10.61	81	1.65
Turbulence in flight, clear air	5	6	5	11	1	10	2	6		4	13	2.75	37	.75
Turbulence associated with clouds and/or thunderstorms	6	26	5	21	3	26	4	18	3	22	21	4.45	113	2.31
Downdrafts, updrafts	17	57	24	60	14	67	10	43	5	64	70	14.83	291	5.94
Local whirlwind	12	1	4	3	9	2	4	2	5	3	34	7.20	11	.22
Tornado			1			1	1		1	2	3	.64	3	.06
Squall line		1		1		1		3		3			9	.18
Adverse winds aloft		3	1	5	1	2		4		1	2	.42	15	.31
High temperature		14		19		27	1	28		5	1	.21	93	1.90
Obstructions to vision		14		13		16	1	17		12	1	.21	72	1.47
High density altitude (Temp./Dew Point)		87	2	83		97	2	78		81	4	.85	426	8.69
Thunderstorm activity	4	45	5	40	2	44	5	47	1	52	17	3.60	228	4.65
Other		3		5		8		5		9			30	.61
Total Weather C's/F's Cited	131	1,193	142	1,094	87	1,191	66	1,219	46	1,205	472	100.00	4,902	100.00
Total C's/F's Cited	7,970	3,576	7,934	3,245	7,395	2,948	6,473	2,694	6,150	3,098	35,922	100.00	15,561	100.00
% of Total C's/F's Represented by Weather C's/F's	1.64	33.36	1.79	33.71	1.18	40.40	1.02	45.25	0.75	38.90	1.31	-	31.50	-

*Source: References 16 and 17. Data represents latest revision. Note that these data represent the number of times the weather phenomenon was cited as a cause and factor, and not the number of related accidents. The number of cause/factor entries made for one accident varies from 1 to a maximum of 10 and averages between 2 and 3.

weather to be a cause but are unable to support such suspicions. It can be conjectured that they then resort to citing it is a factor. Furthermore, no two investigators think or code an accident in precisely the same manner. There are indications in the accident records that the problems associated with weather are not solely meteorological ones. In the cases where weather causes/factors are cited, there exists a high degree of common accident citation with pilot judgment error and operational decision error causes/factors. This observation indicates that the possible problem in this area is the lack of effectiveness of part of the general aviation pilot population to gather, interpret and make decisions about weather conditions. Aside from the cause/factor assignments in the NTSB briefs and as pointed out above, this analysis includes only those accidents which a group of experienced pilots found to be either probably preventable or probably not preventable given the existence of state-of-the-art automated weather sensing devices.

Second, the comparison of accident rates between observation and non-observation environments was limited to a single year. Because of the relatively small variance in the numbers of weather-related accidents between years, as evidenced in Figure 19, this comparison assumes 1979, the most recent year for which NTSB accident records are completed and approved for release, as being representative of an average year.

Third, and finally, this safety benefits analysis rests on general aviation accidents that occurred in either the approach or landing phases of operation. The majority of weather-related accidents occur during these phases of flight. The rationale for excluding accidents occurring during takeoff and climb is that pilots should have adequate knowledge of prevailing weather at the departure airport. While it is conceivable that AWOS might reduce the number of accidents during takeoff, climb and cruise, no benefits are directly ascribed to them in this analysis. They are qualitatively discussed in Section D of this chapter with other indirect or intangible benefits.

To summarize the approach to quantifying the expected safety benefits of AWOS at non-towered and non-federal towered airports:

Preventable Accident Rate = Per Activity Unit	No. of WX-Related Approach/Landing Accidents w/o WX Observations in 1979	-	No. of WX-Related Approach/Landing Accidents with WX Observations in 1979
	Activity without Weather Observations		Activity with Weather Observations

The numerators in the above ratios were derived by (1) examining NTSB briefs of U.S. general aviation accidents involving weather as a cause and/or factor that occurred in CY 1979 in either the approach or landing phases of operation, and (2) cross-referencing the accident sites and time of accident with an inventory of weather observing stations and their respective operating hours. A statistical summary of accidents in both "with" and "without" observation environments are summarized in Appendices A-1 and A-2, respectively.

The denominators in the above ratios are derived separately by accident cause/factor: low ceiling/visibility accident rates per general aviation itinerant operation; and all others separately per general aviation itinerant operation and local operation. Local operations are performed by aircraft which operate in the local traffic pattern of the airport or within sight of the tower, are known to be departing for, or arriving from, flight in local practice areas within 20 miles of the airport, or executing simulated instrument approaches or low passes at the airport. Itinerant operations are all operations other than local operations. Low ceiling/visibility accident rates are denominated in itinerant operation terms because AWOS sensors for ceiling and visibility would have little impact on the incidence of VFR approaches and most IFR approaches are itinerant. Information provided by AWOS on wind, temperature, dew point, precipitation and thunderstorms benefit both types of operation, but more so itinerant than local. Pilots in local flight arrivals, many of which are of a local practice or touch-and-go nature and of relatively short duration, are likely to have some foreknowledge of local prevailing weather conditions.

Operations counts at FAA towered airports are generally viewed as being more reliable than those at non-towered airports. Emphasis has historically been placed on towered airport operation counts for a number of reasons. First, towered airports represent the largest and most active airports in the country. Secondly, towered airports include most of the air carrier airports and therefore their operations data satisfies a popular area of interest, i.e., air carrier traffic. Third, FAA towered airports are the sites where FAA personnel are located and one of the objectives of operations counts is the determination of the requirements for the size of field staffs. The number of active aircraft, hours flown and pilot registrations are also, to an extent, indicators of general aviation activity in the U.S. and forecasts of such parameters are made annually by the FAA. Actual aircraft operations, however, are the truest representation of traffic for facility investment planning purposes. In light of the sensitivity of activity counts on the safety benefits estimated from weather observation systems, a review was made of alternative measures of general aviation activity rather than relying on one as being the best or preferred estimate. The results of this review are outlined in Figure 21 for calendar year 1979.

Accepting the mean in Figure 21 of 151,440,000 operations in CY 1979, the task then becomes determining how many were itinerant and how many were local and for each of these categories how many occurred with weather observations available and how many in environments with weather observations unavailable. The "weather station status," "tower," and "FSS on airport" codes of the September 1980 National Flight Data Center (NFDC) data base (Reference 22) were used to segregate locations and their respective general aviation operations with and without a weather station on site. The data base was supplemented by other agency data to enhance accuracy and completeness (Reference 21). The September 1980 NFDC data base was used because it was thought to best represent activity occurring in CY 1979. Figure 22 summarizes the analysis. Because total general aviation operations recorded in the data base did not represent the entire population (per Figure 21), the counts were proportionately inflated to represent the entire universe of operations.

FIGURE 21

Estimates of Total General Aviation Operations - CY 1979

General Aviation Pilot and Aircraft Activity Survey (Reference 18)	Survey conducted by the FAA in conjunction with the Civil Air Patrol.	158,360,000* (public use airports only)
Systems Consultants, Inc. (Reference 13)	National GA Operations = $10^6 \times (70 + 4.28 \text{ (Year-1960)})$	151,320,000
QUESTEK Corp. (Reference 19)		<u>144,640,000</u>
Mean		151,440,000

*155,600,000 operations in CY 1978 (per Reference 9) \times 51.7/50.8 (ratio of millions of GA operations at FAA towered airports, FY 1979 to FY 1978, per Reference 20). Overstated due to inclusion of air taxi operations but understated by exclusion of non-public use airports. Assumed to be offsetting for these purposes.

As mentioned earlier, low ceiling/visibility accident rates are first denominated in terms of instrument approaches and then converted to and in terms of itinerant operations. These rates are first denominated in terms of annual instrument approaches (AIA's) because low ceiling/visibility accidents correlate best with instrument approach activity. Unfortunately, for reasons which will be explained later, reported counts of instrument approaches are unreliable for many non-towered airports. To correct for and guard against unreliable site-specific data, accident rates per instrument approach are converted to more reliable rates per itinerant operation through a generally accepted regression model. The first step of this exercise is to derive estimates of instrument approach activity with and without weather observations available. These are derived in Figure 23 for CY 1979.

FIGURE 22

General Aviation Operations With and Without Weather Observations Available, CY 1979

	GA Operations ^{1/}		Percent		Adjusted to Enter	
	Local	Itinerant	Itinerant	Total	Itinerant	Total
Airports With Observations Available (Where Weather Station Code and/or Tower Code and/or FSS on Site = Yes)						
	30,087,288	40,617,984	66.03	70,705,272	45,925,093 ^{2/}	79,945,176 ^{4/}
Airports Other Than Above						
	42,341,634	20,892,670	33.97	63,234,304	23,625,313 ^{3/}	71,494,824 ^{5/}
Total	72,428,922	61,510,654	100.00	133,939,576	69,547,580	151,440,000

^{1/}Source: Reference 22.

^{2/}40,617,984 x (151,440,000/133,939,576). To preclude specious accuracy, this estimate is rounded to 45,930,000 in the ensuing analysis.

^{3/}20,892,670 x (151,440,000/133,939,576). Rounded to 23,630,000 in the ensuing analysis.

^{4/}52.798 x 151,440,000 (from Figure 21).

^{5/}47.214 x 151,440,000 (from Figure 21).

FIGURE 23

CY 1979 General Aviation Instrument Approaches
With and Without Weather Observations Available

<u>Facility^{1/}</u>	<u>W/O WX Observ.</u>	<u>W WX Observ.</u>
Towered Airports, FY 1979 ^{2/}		919,457
Non-towered and Non-federal Towered Airports, FY 1979 ^{2/}	186,544	
Non-towered Airports with FSS on Site, FY 1979 ^{3/}	<u>(30,140)</u> 156,404	<u>30,140</u> 949,597
CY 1979 Adjustment Factor ^{4/}	<u>x 1.0127</u>	<u>x 1.0127</u>
Total, CY 1979 ^{5/}	158,390	961,657
Percent	14.141	85.859

^{1/}Airports with an NWS observation facility on site but without an FAA ATCT or FSS are excluded. Operations at such airports are relatively nominal.

^{2/}Source: Reference 23 and 24.

^{3/}Source: References 23, 24, and 25.

^{4/}Because the operations counts are for Fiscal Year 1979 (October 1978 - September 1979), they must be adjusted to Calendar Year 1979 (January 1979 - December 1979) to be consistent with other parts of this safety benefits analysis. For approximately 4,000 airports, the Terminal Area Forecasts (Reference 26) report 120.5 and 126.6 million national general aviation operations for Fiscal Years 1979 and 1980, respectively. This data suggests a fiscal to calendar year conversion factor of 1.0127, ignoring compounding, seasonality and other factors $((120.5 \times 9/12) + (126.6 \times 3/12))/120.5$.

^{5/}To preclude specious accuracy, these estimates are rounded to 158,000 and 962,000 in the ensuing analysis.

As mentioned at the outset of this accident analysis description, the difference in rates of accidents at sites with and without weather observations available is used to estimate the effect of weather observation systems on accidents. The number of cause/factor entries made for any one accident by the NTSB is determined by the judgment of the accident analyst(s), investigator(s) or board member(s) of the NTSB itself and varies with the type of aircraft and injury level. The number of cause/factor entries per accident varies from 1 to a maximum of 10, and averages between 2 and 3. The cause/factor and other NTSB data entries, supplemented with other relevant data, provides enough information about accidents to permit a reasonable assessment of whether or not a weather observation might have prevented the accident.

But this procedure yields the expected number of accidents that might be affected, which is greater than the number that would be prevented. The difficulty with this approach is that other systems may be influencing the accident rate perhaps as much or more than the weather observation itself. One such system is the availability of a precision approach system, as it affects the accidents related to low ceiling/visibility. Airports with higher levels of traffic tend to have both precision approaches and weather observations. So it is difficult to determine which is actually lowering the rate. Although similar difficulties occur with cause/factors other than ceiling/visibility, the difficulty is especially significant here because a major portion of the safety benefit of AWOS at non-towered airports is the reduced risk and incidence of this type of accident. Besides precision approaches, other influences may include airport environment, pilot competence, etc. The unadjusted difference in low ceiling/visibility accidents (from Figure 25) is:

Acc. Rate W/O WX Obs. - Acc. Rate W WX Obs.

$$= \frac{25 \text{ accidents}}{158,000 \text{ AIA's}} - \frac{27 \text{ accidents}}{962,000 \text{ AIA's}}$$

$$= .0001582 \text{ per AIA} - .0000281 \text{ per AIA}$$

$$= 1.301 \times 10^{-4} \text{ per AIA}$$

To correct for the influence of precision approach systems and other factors on the "with" weather observation accident rate, the .0000281 value is inflated by the number of times the historic non-precision instrument approach accident rate exceeds the historic precision instrument approach accident rate (3.5 derived from References 10 and 27). The result must then be adjusted by the ratio of precision instrument approaches to total instrument approaches (.73 in 1979):

$$\frac{27 \text{ accidents}}{962,000 \text{ AIA's}} \times 3.5 \times .73 = .0000717$$

Substituting,

$$.0001582 \text{ per AIA} - .0000717 \text{ per AIA}$$

$$= .865 \times 10^{-4} \text{ per AIA}$$

It is acknowledged that precision approach systems may have influenced the "without" weather observation accident rate also, but intuitively to only a small degree since relatively few of the instrument approaches in the "without" weather observation environment were precision. It is hoped that this omission is offset by other factors that may influence accident rates but which are not accounted for in this analysis.

Historically, there have been numerous instances where inaccurate AIA counts have been obtained. Reported AIA counts of less active non-towered airports especially appear to be erratic and understated. AIA's at these sites are often obtained using pilot reports, IFR flight plan data, or counts by a neighboring airport. At smaller airports--those that fall far below establishment levels for precision approach facilities but which might otherwise be eligible for an AWOS--there has been little incentive to maintain accurate records of instrument approach activity. Another explanation for AIA inaccuracies is the ambiguity of the definition. Key questions focus on how to treat approaches when the pilot cancels an IFR flight plan while in the air and on the correct identification of the minimum initial approach altitude for each aircraft category. Lastly, it is believed that AIA reporting is typically given low priority by air traffic controllers with actual AIA counting occurring on a time-available basis.

A preferred alternative to using reported general aviation AIA's is to estimate AIA_{GA} based on annual general aviation itinerant operations and the probability that the weather will require an instrument approach. Systems Control, Inc., (Reference 28) derived the following model for accomplishing this:

$$AIA_{GA} = \frac{GATN}{2} \times (PIFR - PC) \times (.8 - .5R)$$

where

GATN is the number of annual general aviation itinerant operations,

PIFR is the probability of weather below VFR minima (which is assumed here to be weather in which the visibility is 3 miles or less and/or the ceiling is at or below the minimum initial approach altitude),

PC is the probability of weather below IFR minima, and

R is the ratio of general aviation operations to total operations.

The divisor in the first term reflects the assumption that half of operations are landings. The second term (PIFR - PC) measures the portion of time that an instrument approach is necessary and can be completed. Accurate determination of this term depends on site specific values of PIFR and PC. For a national average, more than 1,000 instrument approach plates were examined and it was determined that the nonprecision approach ceiling minimum for general aviation aircraft is 700 without and 600 with an approved altimeter setting source. The frequency of instrument weather below these ceilings can be obtained from Figure 24, based on average historic distributions of hourly ceiling and visibility observations. A 700 foot ceiling and visibility of 1 mile yields a value of 4.95 percent for PC and the VFR minimum ceiling of 1500 feet and visibility of 3 miles yields a value of 13.50 percent for PIFR. The third term (.8 - 5R) tends to reflect what fraction of

flights have pilots qualified and aircraft equipped to make instrument approaches. Note that if a location that doesn't have an approved instrument approach procedure, AIA_{CA} would equal zero since P_C would equal P_{IFR}.

FIGURE 24

Percentage Distribution of Weather Observations
Less than Selected Ceilings and Visibilities*

Ceiling (feet)	Visibility (miles)							
	1/16	1/8	1/4	1/2	3/4	1	1-1/2	3
100	0.34	0.43	0.65	0.99	1.43	1.95	3.10	7.09
200	0.71	0.76	0.89	1.12	1.52	2.02	3.14	7.10
300	1.21	1.24	1.34	1.48	1.79	2.22	3.26	7.13
400	1.89	1.92	2.00	2.13	2.37	2.72	3.63	7.29
500	2.67	2.69	2.77	2.88	3.09	3.39	4.20	7.61
600	3.46	3.49	3.56	3.67	3.84	4.10	4.82	7.99
700	4.36	4.39	4.46	4.57	4.72	4.95	5.60	8.57
800	5.26	5.29	5.36	5.46	5.60	5.81	6.40	9.15
1,000	7.04	7.07	7.14	7.24	7.36	7.54	8.05	10.48
1,500	10.63	10.66	10.73	10.82	10.92	11.06	11.47	13.50
2,000	13.33	13.35	13.42	13.51	13.60	13.74	14.09	15.92
3,000	17.90	17.93	18.00	18.08	18.18	18.29	18.60	20.22

*Source: Derived from Reference 29.

Using this regression model and national average values, the accident rate differential for low ceiling/visibility accidents can be redenominated from per AIA terms to per itinerant operation terms as follows:

$$\begin{aligned}
 & .865 \times 10^{-4} \text{ per AIA} \\
 & = .865 \times 10^{-4} \text{ per } ((\text{GAITN}/2) \times (\text{PIFR} - \text{PC}) \times (.8 - .5R)) \\
 & = .865 \times 10^{-4} \text{ per } ((\text{GAITN}/2) \times (.1350 - .0495) \times (.8 - .5(.85))) \\
 & = 1.387 \times 10^{-4} \text{ per GAITN}
 \end{aligned}$$

The above result will be applicable, of course, only to candidate sites that either already have approved standard instrument approach procedures (SIAP's) or potential SIAP's as the result of installing AWOS. For other candidate sites, this benefit will be suppressed since the benefit accrues essentially only to IFR approaches. Also, this benefit value will be used in the Phase I criteria and for cases where site-specific data are not available. When site-specific data are available, they will be used in the Phase II screening process to compute the site-specific safety benefits afforded by ceiling and visibility sensors.

In addition to low ceiling/visibility accidents, the accident rates with weather observations available for other weather phenomena must also be adjusted for the potential influence that other factors might have. Lacking more specific data, the relative adjustment made to the low ceiling/visibility accident rate with observation available is also applied to the other weather phenomena $((.717 \times 10^{-4})/ (.281 \times 10^{-4})$ or approximately 2.55). These adjustments are illustrated in Figure 25 which summarizes the results of this section. As mentioned earlier, this analysis extends benefits of AWOS detection and reporting of wind, temperature, dew point, precipitation and thunderstorm information separately for itinerant and local operations. Reference 18 suggests that approximately 70 percent of general aviation itinerant operations and 40 percent of general aviation local operations (in both instances excluding air commuter and air taxi from the data base) utilize some source of inflight weather information service. By rough analogy, the ratio of 40 percent to 70 percent, or approximately 60 percent, is used as the ratio of benefits of local operations to itinerant operations.

c. Military

Because the characteristics of military aircraft which use civil non-towered and non-federal towered airports are reasonably akin to those of general aviation aircraft (at least within the accuracy of this analysis), the benefits derived in this chapter for the general aviation user class are also ascribed to the military user class. As with reported counts of annual AIA's of general aviation aircraft at non-towered airports, reported AIA's of military aircraft may also be questionable. To guard against this possibility, benefits attributable to reduced accidents related to low ceiling/visibility are denominated in per itinerant operation terms and will apply only to those candidate sites with existing standard instrument approach procedures (SIAP's) or potential SIAP's as the result of installing AWOS.

d. Accident Costs

Accident costs consist of losses associated with personal injuries and property damage. Personal injuries are categorized by fatalities, serious injuries, minor injuries and no injuries. Property damage is categorized by aircraft damage and damage to other property. Aircraft are damaged to varying degrees in aviation accidents. Some are completely destroyed, others substantially damaged, and some incur only minor damage or none at all. Because of the high degree of variability in damage to nonaircraft property, no direct allowances are made for such losses in this report. This omission is immaterial because the types of accidents pertinent to this analysis seldom result in physical damage to property other than the aircraft.

The unit values attached to these losses or "critical values" in this report are taken from Report Number FAA-APO-81-3, Economic Values For Evaluation of Federal Aviation Administration Investment and Regulatory Programs (Reference 9). Adjustment of the critical values derived in Reference 9 to 1981 dollars is outlined in Appendix B. Each critical value is briefly described below.

FIGURE 25

Summary Statistics of Avertable General Aviation Accidents Involving Weather As A Cause/Factor in CY 1979

	No. of Accidents/ W/O WX With WX		CA Activity (000) 2/ W/O WX With WX		Accident Rate W/O WX Observ. (x 10 ⁻⁶) Per Itin. Opn. Local Opn. 3/		Accident Rate With WX Observ. (x 10 ⁻⁶) Per Itin. Opn. 4/ Local Opn. 3/		Difference x 10 ⁻⁶ Per Itin. Opn. Local Opn.	
	Observ.	Observ.	Observ.	Observ.	Observ.	Observ.	Observ.	Observ.	Observ.	Observ.
Unfavorable Winds and Wrong Runway	140	40	23,630 ITN	45,930 ITN	5.925	3.555	2.221	1.333	3.704	2.222
Temperature/Dew Point	5	2	23,630 ITN	45,930 ITN	.212	.127	.111	.067	.101	.060
Low Ceiling/Visibility	255/	275/	158 AIA	962 AIA	.169	.101	.056	.034	1.3876/	-
Rain, Hydroplaning or Wet Runway	4	1	23,630 ITN	45,930 ITN	.085	.051	.034	.017	.113	.067
Thunderstorms	2	1	23,630 ITN	45,930 ITN						

1/Source: Appendices A-1 and A-2. The numbers of accidents listed here are less than those outlined in Figure 19 because of the parameters guiding this analysis (as outlined at the outset of this accident analysis).

2/Source: Figure 22.

3/60 percent of that per itinerant operation (see text).

4/Inflated to allow for factors other than weather observations which may have influenced accident rate differentials. See text.

5/Represents only those accidents in which aircraft was on IFR approach. VFR approach accidents were excluded because the existence of an operating weather observing system would probably have had little influence on the course of events.

6/Derived in text.

- (1) Value of a Statistical Life. The somewhat subjective and conceptual construct of the value of a statistical life is a basic tool of economists, program planners and others interested in measuring the social benefits associated with investments and regulatory actions in public programs. Although life is felt to be precious and essentially invaluable, economic decisions must be made continually, either explicitly or implicitly, between safety and other competing demands for limited resources. Literature on the subject suggests values ranging from tens of thousands of dollars to several million dollars. Reference 9 outlines alternative approaches to valuing life and finds the "value to self and others" approach to be the most conceptually sound and comprehensive measure for FAA investment and regulatory decisionmaking purposes. As the name suggests, this approach takes into account the value of life to the individual as well as the value of the individual's life to the rest of society. Appendix B illustrates the derivation of the value of a statistical life of \$580,000 in 1981 dollars.
- (2) Unit Costs of Statistical Aviation Injuries. Similar to the value of a statistical life, Reference 9 finds the "value to self and others approach" to provide the most conceptually sound and comprehensive measure of the costs of statistical aviation injuries. Appendix B illustrates the derivation of the estimated unit costs of statistical serious and minor aviation injuries of \$42,000 and \$16,000, respectively, in 1981 dollars.
- (3) Unit Costs of Aircraft Damage. The loss of an aircraft completely destroyed can be taken as the market value of an equivalent replacement. By using actual market values, depreciation and obsolescence are implicitly taken into account. Insurance experience reveals that the average restoration cost of a substantially-damaged aircraft is approximately one-third of its market or replacement value. Repair costs of aircraft incurring minor damage are assumed in this report to be 50 percent of those for substantially-damaged aircraft. Appendix B illustrates the derivation of unit losses associated with various aircraft type categories and degrees of damage in 1981 dollars.

To derive the total historic accident costs associated with weather phenomena which are detectable/measurable by AWOS, the unit critical values updated in Appendix B must be matched against the numbers and severity of personal injuries and aircraft damage. This is done in Figure 26 for each relevant weather cause/factor by quantifying in dollar terms the total costs of the accidents in Appendix A. It is noted that the costs of accidents for which low ceiling or visibility was cited as a cause/factor far exceed the costs of the other accidents.

e. Derivation of Safety Benefits Per Aviation Activity Unit

Given the expected accident costs associated with the various relevant accident cause/factors and the accident statistics from Appendix A, the task now is to translate the costs per accident into costs per activity unit or conversely, the expected contributory benefit per activity unit. This is accomplished in Figure 27. Although the safety benefits derived in this section are computed only for accidents occurring in the approach

FIGURE 26

Costs of General Aviation Accidents Occurring in CY 1979 For Which Cause(s)/Factor(s) Were Cited Which Are Detectable/Measurable By ANOS (Thousands of 1981 Dollars)

Cause/Factor	Personal Injuries			Aircraft Damage			Total Accident Costs
	Number Fatal	Number Serious	Number Minor	No. Destroyed x \$50	No. Substantial x \$16	No. Minor x \$2	
Unfavorable Winds or Wrong Runway	8	18	47	\$ 4,640	\$ 756	\$ 752	\$ 9,498
Temperature/Dew Point Low Ceiling/Visibility ^{1/}	0	0	4	0	0	64	176
Rain, Hydroplaning or Wet Runway	63	25	17	36,540	1,050	272	39,884
Thunderstorms	0	2	0	0	84	0	198
Totals	71	45	69	\$41,180	\$1,890	\$1,104	\$49,820

^{1/}Source: Appendix A. These data are less than those displayed in Figure 19 because this analysis includes only those accidents which a group of experienced pilots found to be probably preventable given availability of weather observations.

^{2/}The unit cost of an aircraft incurring minor damage is assumed to be 50 percent of that of a substantially-damaged aircraft.

^{3/}Includes statistics for only those accidents in which the aircraft involved was on an IFR approach.

FIGURE 27

Safety Benefits Per General Aviation and Military Activity Unit By Weather Phenomenon
at Non-Towered and Non-Federal Towered Airports

<u>Weather Phenomenon</u>	<u>Expected Preventable Accident Rate (x10⁻⁶)^{1/}</u> <u>Per Itinerant Operation Per Local Operation</u>	<u>Expected Cost Per Accident^{2/}</u>	<u>Expected Benefit Per Itin. Opn.</u>	<u>Local Opn</u>
Unfavorable Winds and Wrong Runway	3.704	\$53,000	\$.1963	\$.1178
Temperature/Dew Point	.101	25,000	.0025	.0015
Low Ceiling/Visibility	1.387	767,000	1.064	-
Rain, Hydroplaning or Wet Runway	.113	40,000	.0045	.0027
Thunderstorms	.029	21,000	.0007	.0004

^{1/}From Figure 25.

^{2/}Figure 26 divided by Figure 25, rounded to nearest thousand.

and landing phases of operation, the avertable accident rates in Figure 27 are derived in per operation terms. Denomination in these terms will facilitate application of the criteria developed in this report since aircraft activity statistics are counted and published in such terms. The "per operation" safety benefits derived in Figure 27 are applicable to both the Phase I and Phase II benefit/cost screening processes, except for avertable accidents related to low ceiling/visibility in Phase II. Benefits of avertable low ceiling/visibility accidents will be computed in Phase II using site-specific data. If site-specific data are not available, the Phase II process will use the Phase I benefit.

3. Efficiency Benefits

a. Introduction

Efficiency benefits accrue to each user class at non-towered and non-federal towered airports as the result of implementing AWOS. Commercial air carrier and air taxi operators who operate and maintain Supplementary Aviation Weather Reporting Stations (SAWRS) realize cost avoidance benefits as a result of AWOS replacing the need for SAWRS. The general aviation and military user classes benefit from the reduced risk and incidence of instrument and visual flight disruptions, thus enhancing accessibility of the airport. These benefits are developed in Section 3b for the air carrier and air taxi user classes, Section 3c for the general aviation user class, and in Section 3d for the military user class.

b. Air Carrier and Air Taxi

Approaches to airports in instrument weather conditions are governed by FAR Part 91 for all operators, Part 121 for air carrier operators and Part 135 for air taxi and other commercial operators. These regulations require an approved weather observation service for commercial instrument flight operations. Private operators can still use the airport without a weather observation service operating, but, as discussed later in this section, delays, cancellations, and diversions can result. For the air carrier and air taxi user classes, three alternative approaches were considered for deriving the benefits of avertable flight disruptions afforded by a weather observing system:

- o When an FAR Part 121 or 135 operator desires to serve an airport for which neither the FAA or the NWS have regular weather observations, the operator must resort to a self-operated Supplementary Aviation Weather Reporting Station (SAWRS). Therefore, one approach to assessing the benefits of AWOS to such operators is by reference to the avoided costs of operating a SAWRS. This approach is discussed below in further detail.
- o The second approach considered is based on the avoidance of costs of diversions to an alternate airport. When weather conditions at an airport receiving scheduled service are such that schedules cannot be met, air carriers often provide ground transportation from an alternate airport which is open, or reimburse passengers for meals and lodging until the

destination is accessible. This practice is most common during periods when weather falls below instrument minima. This approach assumes a benefit from avoiding these costs--the value of passengers' time plus whatever aircraft operating costs that are incurred to divert to the alternate airport. Picture, for example, an airport with visual minima of 1500 feet (ceiling) and 3 miles (visibility) and instrument minima of 600 feet and 1 mile. Figure 24, in the preceding section of this chapter, suggests that weather less than visual minima can be expected to prevail on average approximately 13.5 percent of the time and less than instrument minima approximately 4.1 percent of the time. The difference, or 9.4 percent, is the relative time that a Part 121 or 135 operator would be prohibited from serving this airport without the availability of a weather observation service. Since the costs associated with diversions are likely to be much greater than the operator's annualized cost of operating and maintaining a SAWRS, this approach was rejected.

- o The third approach assumes that in the absence of an observing capability, an operator would simply elect not to operate out of the airport. Air passengers tend to make personal or business plans which are not disrupted if the air service is unexpectedly denied them, and may not use a service at all if flights are possible only in visual conditions. Since it is not possible to put a dollar value on denial of service, this approach was rejected.

The avoided cost to an operator taking its own weather observations appears to be the most viable and encompassing approach to quantifying the benefits of AWOS to air carrier and air taxi operators. Figure 28 derives an annualized estimate of this avoided cost of \$9,548. A comparison of the 1981 inventory of SAWRS stations at airports in the fifty United States, Puerto Rico and the Virgin Islands (Reference 30) and their respective air carrier and air taxi operations from the Terminal Area Forecasts (Reference 26) suggests that the typical SAWRS station has 3,000 or more annual air carrier and air taxi operations (i.e., the sum of annual air carrier and air taxi operations is generally 3,000 or more). Therefore, it can be generally said that such airports generally have SAWRS operators which would benefit from the installation of an AWOS.

An argument can also be made for attributing efficiency benefits to the air carrier and air taxi user classes at non-towered and non-federal towered airports without a SAWRS operation on site. Implementation of AWOS at these airports may attract commercial operators over time and induce others to expand, resulting in greater utilization of the airport and potentially enhancing community and regional economic growth by drawing new businesses to the area and enhancing the ability of existing businesses to expand. Many smaller communities, in particular, are dependent upon air transportation to support their economic development. Accordingly, the criteria developed in this report recognize AWOS benefits to commercial operators, either with or without operating a

SAWRS prior to implementing AWOS. The benefits will range from a high of \$9,548 (the annualized cost of a SAWRS) to low of zero (where there are no air carrier or air taxi operations). Expressed in relation to a benefit/cost ratio,

$$\frac{\sum_{n=1}^{15} \left(\frac{\text{Lesser of } ((ACITN + ATITN) \text{ or } (3,000))}{3,000} \times \frac{\$9,548}{(1+i)^{n-.5}} \right)}{LCC}$$

where 'n' is each year of an assumed economic life of 15 years, ACITN and ATITN are the annual numbers of air carrier and air taxi operations, 3,000 is the activity level at or above which characterizes airports with SAWRS, \$9,548 is the annualized cost of a SAWRS, 'i' is the OMB-prescribed discount rate of 10 percent and LCC is the life-cycle cost of AWOS. Note that the value of 3,000 limits the benefits to \$9,548 annually.

FIGURE 28

Annualized SAWRS Operations, Maintenance and Capital Recovery
Costs Allocable to Weather Observation Function (1981 Dollars)

Facilities and Equipment Costs

Equipment ^{1/}	\$ 1,900	
Initial Spares ^{1/}	+ 475	
Total	\$ 2,375	
Life-Cycle Capital Recovery Factor ^{2/}	x .13147	\$ 312

Operations and Maintenance Costs^{1/}

Personnel		
Observation ^{3/}	\$ 7,056	
Maintenance	216	
Spares Inventory	228	
Communications	0	
Facilities	<u>1,736</u>	<u>9,236</u>

Annualized Cost \$9,548

^{1/}From Figure 16.

^{2/}Capital recovery for a uniform series with present value of \$1:
 $i(1+i)^n / ((1+i)^n - 1)$. Applying a 10 percent interest factor (i) and
a 15 year economic life (n) yields 0.13147.

^{3/}SAWRS are assumed to operate 8 hours daily.

c. General Aviation

Part c(1) of this section addresses benefits of avertable flight disruptions of general aviation instrument flights. Part c(2) addresses benefits of avertable flight disruptions of general aviation visual flights.

(1) Instrument Flights

(a) Introduction

Flight disruptions to general aviation instrument flights are comprised of delays, diversions and cancellations. Reducing the risk and incidence of such flight disruptions can be realized through lowered minima requirements allowed with the availability of an on-site altimeter setting source. Delay and diversion benefits are evaluated in this analysis from the perspective of the pilot receiving information from an AWOS while airborne. It is assumed that without the weather observation, the pilot would be unable to descend low enough to see the runway and would be delayed or would fly to an alternate airport. Cancellation benefits are evaluated from the perspective of arrival flights at destination which otherwise would be cancelled if the destination airport doesn't have a weather observing capability.

(b) Benefit of Lowered Minima

As described in the previous section, each instrument approach procedure specifies a minimum altitude to which a pilot may descend, called the "decision height" (DH) or the "minimum descent altitude" (MDA). The basic criteria for setting landing minima are contained in the third edition of the United States Standard for Terminal Instrument Procedures (TERPS), Handbook 8260.3B (Reference 6). The minimum altitude of approach procedures is increased in relation to the distance from the remote altimeter setting source to account for potential differences in barometric pressure. According to TERPS, paragraph 323b, when the altimeter setting is derived from a source further than 5 miles from the runway threshold, the minima are increased by 5 feet for each mile in excess of five miles.

Until 1976, the use of remote altimeter settings had been authorized by FAA regardless of the terrain between the runway and the remote altimeter setting source. However, Notice N 8260.24 (Reference 5) changed this by prohibiting the use of remote altimeter settings at airports in precipitous terrain. In precipitous terrain or where reasonably homogeneous weather characteristics cannot be determined, the notice requires the DH to be raised 10 feet for each mile the altimeter setting is distant from the runway threshold. An MDA is increased with the same rule, or to 1,500 feet, whichever is greater. The altimeter setting must be no more distant than 50 miles.

Of 1,733 airports currently with approved standard instrument approach procedures, IFR approaches by Part 91 operators at 1,307 (or approximately 75 percent) of these locations are conducted with altitude information

derived from a remote service (Reference 4). Full time remote altimeter setting are required at approximately 931 (54 percent) airports (Reference 4).

The annual benefits to general aviation instrument flights of avoiding flight disruptions because weather observations are available can be expressed as:

$$AB_{AIFD} = AN_{AIFD} \times C_{IFD}$$

where, for avoidable instrument flight disruptions, AB_{AIFD} is the annual benefit, AN_{AIFD} is the annual number, and C_{IFD} is the avoided unit cost.

The annual number of instrument flight disruptions avoided (AN_{AIFD}) can be approximated by the product of the annual number of instrument approaches (AIA_{GA}) and the probability (P_{AIFD}) that a weather observation system would allow the flight to land instead of being disrupted. Through substitution the formula becomes:

$$AB_{AIFD} = AIA_{GA} \times P_{AIFD} \times C_{IFD}$$

The following paragraphs explain the derivation of values for each of the factors in the above formula.

(i) Annual Instrument Approaches (AIA_{GA}):

An instrument approach is an approach made to an airport by an aircraft on an IFR flight plan when the visibility is less than 3 miles or the ceiling is at or below the minimum initial approach altitude.

As explained in the previous section, reported AIA's at less active airports are often inaccurate. As in the previous section, this section relies on a regression model by Systems Control, Inc. (Reference 28) for computing AIA_{GA} in lieu of relying on reported AIA's:

$$AIA_{GA} = \frac{GAITN}{2} \times (P_{IFR} - P_C) \times (.8 - .5R)$$

where

$GAITN$ is the number of annual general aviation itinerant operations,

P_{IFR} is the probability of weather below VFR minima (which is assumed here to be weather in which the visibility is 3 miles or less and/or the ceiling is at or below the minimum initial approach altitude),

P_C is the probability of weather below IFR minima, and
 R is the ratio of general aviation operations to total operations.

The divisor in the first term reflects the assumption that half of operations are landings. The second term ($P_{IFR} - P_C$) measures the portion of time that an instrument approach is necessary and can be completed. Accurate determination of this term depends on site specific values of P_{IFR} and P_C . For a national average, more than 1,000 instrument approach plates were examined and it was determined that the

nonprecision approach ceiling minimum for general aviation aircraft is 700 without and 600 with an approved altimeter setting source. The frequency of instrument weather below these ceilings can be obtained from Figure 24 in the previous section of this chapter. A 700 foot ceiling and visibility of 1 mile yields a value of 4.95 percent for P_C and the VFR minimum ceiling of 1500 feet and visibility of 3 miles yields a value of 13.50 percent for P_{IFR} . The third term $(.8 - 5R)$ tends to reflect what fraction of flights have pilots qualified and aircraft equipped to make instrument approaches.

Using national average values for P_{IFR} , P_C and R , AIA_{CA} can be solved as follows:

$$\begin{aligned} AIA_{CA} &= (GAITN/2) \times (.1350 - .0495) \times (.8 - .5 (.85)) \\ &= .0160 \times GAITN \end{aligned}$$

Note that if a candidate site doesn't have an approved instrument approach procedure (SIAP), AIA_{CA} would by definition be equal to zero because P_C would equal P_{IFR} . As indicated above, many locations cannot utilize a remote altimeter setting source and are therefore restricted from having instrument approaches. In those instances where the lack of an on-site altimeter setting source is the sole reason for the absence of an SIAP, the introduction of AWOS with an altimeter sensor could lead to approval of instrument procedures. Therefore, benefits of avertable flight disruptions will apply only to locations with actual or "would-be" standard instrument approach procedures.

The Phase I criteria developed in this report for publication in Airway Planning Standard Number One (Reference 1) are based on national average values for P_{IFR} , P_C and R . The Phase II benefit/cost computer screening program, however, allows site-specific values for these variables. If site-specific values are not available, national averages will be used as default values.

(ii) Probability of Averting a Disruption ($PAIFD$)

The probability of avoiding an instrument flight disruption ($PAIFD$) because an AWOS installation has eliminated the remote altimeter setting penalty and lowered minima requirements can be approximated by the relative increase in the percentage of time the airport is above minima for instrument approaches. Using average ceiling minima of 600 feet and 700 feet respectively for instrument approaches with and without an approved altimeter setting source, based on the survey mentioned above, $PAIFD$ can be expressed as:

$$PAIFD = \frac{(\text{Probability of WX LT 700/1}) - (\text{Probability of WX LT 600/1})}{(\text{Probability of WX LT 1500/3}) - (\text{Probability of WX LT 700/1})}$$

Substituting the values from Figure 24 yields:

$$\begin{aligned} PAIFD &= \frac{4.95\% - 4.10\%}{13.50\% - 4.95\%} \\ &= \frac{0.85\%}{8.55\%} \\ &= .10 \end{aligned}$$

In other words, since the availability of weather observations can be expected to reduce average minima from 700/1 to 600/1, one can expect an increase of 10% in airport utilization during instrument weather conditions and a corresponding 10% decrease in instrument flight disruptions.

(iii) Unit Cost of a Disruption (CIFD)

An FAA-APO-230 document entitled "Benefits of Reduced Flight Disruption" (Reference 31) standardizes the costs of flight disruptions by user class. For general aviation, Reference 31 provides the following:

	<u>Cost Equation</u>	<u>Weight</u>
Delay	$(0.5 V_{PT})n + 0.30 AOC_4$	0.38
Cancellation	$2 V_{PT} n$	0.55
Diversion	$(2.0 V_{PT} + V_{DVG})n + 1.5 AOC_4$	<u>0.07</u>
		1.00

where V_{PT} is the hourly value of passengers'/occupants' time, n is the average number of deplaning passengers/occupants from a general aviation flight, AOC_4 is general aviation aircraft variable operating cost per airborne hour, and V_{DVG} is general aviation passenger handling expenses for diverted passengers. Appendix B derives values for V_{PT} and AOC_4 of \$19.00 and \$84.00 respectively (1981 dollars). Reference 31 provides values for n and V_{DVG} of 2.4 and \$53 respectively (1981 dollars). Substituting,

Delay	$\$48.00 \times 0.38 = 18.24$
Cancellation	$\$91.20 \times 0.55 = 50.16$
Diversion	$\$344.40 \times 0.07 = \underline{24.11}$
	\$92.51,
	or
	\$93.00

(c) Summary

The formula for determining the annual benefits to general aviation instrument flights of avoiding flight disruptions because a weather observing system has eliminated the remote altimeter setting penalty and lowered minima requirements can be summarized as:

$$\begin{aligned}
 AB_{AIFD} &= AN_{AIFD} \times CIFD \\
 &= AIA_{GA} \times PA_{IFD} \times CIFD \\
 &= .0160 \times GA_{ITN} \times .10 \times \$93 \\
 &= GA_{ITN} \times \$1.488
 \end{aligned}$$

(2) Visual Flights

(a) Introduction

In addition to benefiting flights approaching an airport in instrument weather conditions, a weather observing system benefits approaching flights in visual conditions as well. In visual conditions it is assumed that a pilot can see the airport and the ground from at least a distance equal to the basic VFR visibility of one mile. The ceiling and visibility data of the observation are not likely to result in avoiding any disruption to the flight. However, the foreknowledge of wind information could in some cases avoid the need to fly over the airport to determine preferred landing direction. The following paragraphs outline the assumptions and methodology used to compute this delay benefit.

(b) Benefit of Avoided Overflights

An equation similar to that used to compute the benefit of avoided instrument flight disruptions is used to determine the benefit of avoided overflights:

$$AB_{AO} = AN_{AO} \times C_{AO}$$

where, for avoidable overflights, AB_{AO} is the annual benefit, AN_{AO} is the annual number, and C_{AO} is the avoided unit cost.

The annual number of itinerant overflights avoided (AN_{AO}) can be approximated by the product of the annual number of general aviation itinerant operations (G_{ITN}), the fraction of those that are arrivals (F_A), the fraction of those that are conducted in visual conditions (F_{VC}), and the fraction of those that can be expected to overfly in the absence of a weather observation (F_O). Through substitution the formula becomes:

$$AB_{AO} = G_{ITN} \times F_A \times F_{VC} \times F_O \times C_{AO}$$

The following paragraphs explain the derivation of values for each of the unknown factors in the above formula and derives a solution.

(i) Fraction of Total General Aviation Itinerant Operations that are Arrivals (F_{IA}):

It is assumed that half of itinerant operations are arrivals.

(ii) Fraction of General Aviation Itinerant Arrivals Conducted in Visual Conditions (F_{VC}):

Applying national average values of .1350, .0495 and .85 for P_{IFR} , P_C and R respectively to the SCI model discussed earlier suggests that approximately 3.2 percent ($.0160 \times 2$) of general aviation itinerant arrivals are conducted in instrument conditions. Conversely, the fraction of general aviation itinerant arrivals that are conducted in visual conditions (F_{VC}) is 1.0 less .032, or 0.968.

(iii) Fraction of General Aviation VFR Itinerant Arrivals that can be Expected to Overfly in the Absence of a Weather Observation (F_0)

It is postulated that pilots need to overfly the airport to determine landing direction for some fraction of the total number of approaches to the airport (F_0). Ignoring intersecting runways, the fraction was reduced in the following way. First, it is assumed that a pilot approaching an airport when the wind is equal to or greater than 15 knots will have some other way of determining the landing direction--either by non-aviation visual indications (e.g., smoke), by weather conditions at a nearby airport, or by the pilot's knowledge of the synoptic situation. For a sample of 24 airports, Reference 32 indicates that the wind is equal to or greater than 15 knots an average of 11 percent of the time.

Second, it is assumed that the pilot can call the Unicom or other aircraft operating in the airport area to determine the landing direction 70 percent of all arrivals. For the other 30 percent of all arrivals, it is assumed that the Unicom is not operating and that no other aircraft could be contacted. This assumption rests on the fact that the relatively busier non-towered airports are the most likely non-towered airports to qualify for AWOS and that these airports are likely to have Unicom and/or aircraft operating in the airport vicinity which could provide the information to the itinerant pilot.

Finally, it is assumed that if the wind is less than 5 knots, and if the pilot has a weather observation system report of that but no contact with Unicom or other aircraft operating at the airport, the pilot would need to overfly the airport anyway, because either landing direction could be used and the pilot would want to observe local conditions which could not be reported by the equipment, or other traffic and preferred direction due to obstructions, terrain, etc. Again from Reference 32, the wind is less than or equal to 5 knots 24 percent of the time.

The fraction of avoidable itinerant overflights is therefore the product of the percentage of time the wind is equal to or greater than 5 and less than 15 knots, and the time Unicom or another aircraft could not have given the landing direction to the pilot. Summarizing, the fraction of general aviation VFR itinerant arrivals that can be expected to overfly in the absence of a weather observation (F_0) is:

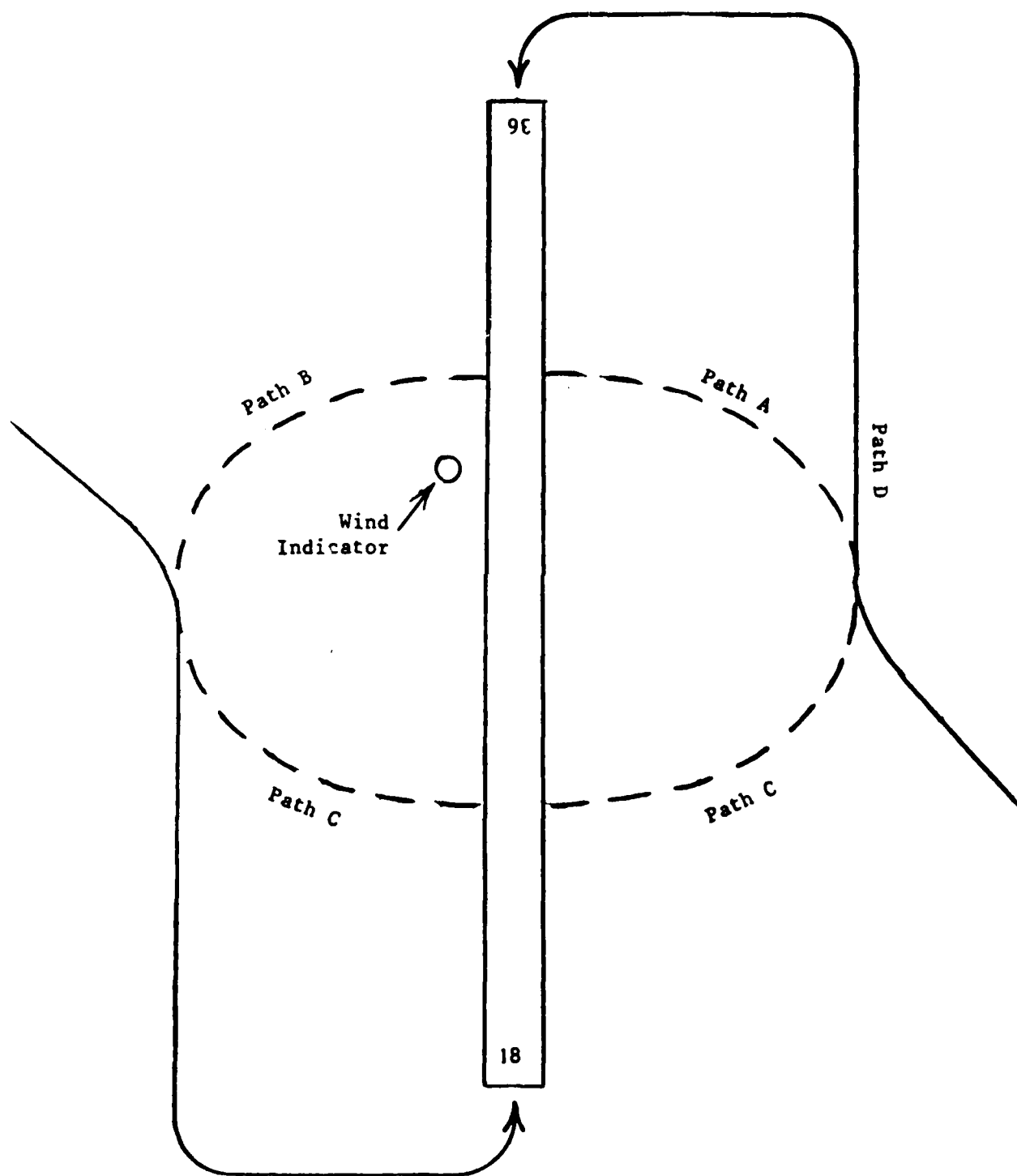
$$F_0 = (1.00 - 0.11 - .24) \times 0.30 \\ = 0.195$$

(iv) Unit Cost of a Disruption (C_{AD})

Figure 29 illustrates a typical one-runway airport with a traffic pattern as recommended in Paragraph 223 of the Airman's Information Manual (Reference 33). It is assumed that an aircraft, approaching to land in the absence of a wind advisory, will fly over the airport to view the wind indicator, as shown on Path A. If the pilot finds that Runway 18 is appropriate for the wind direction shown, no extra flight is required to

FIGURE 29

Typical One-Runway Airport



continue along Path B. If the wind indicates that Runway 36 is preferred, the pilot would have to fly along Path C to land on Runway 36. If he had prior knowledge of the landing direction, he could simply fly Path D. It is estimated that the added time in using Path C results in one extra minute of flying time and that the pilot would arrive from the side of the airport which would necessitate Path C 50 percent of the time. An average of 30 seconds per arrival applied to the weighted general aviation hourly operating cost of \$84.00 from Appendix B (including aircraft variable operating costs and the value of occupants' time of all general aviation aircraft other than turbojets/fans), yields \$.70 as the unit cost of an overflight.

(c) Summary

The formula for determining the annual benefits to general aviation itinerant visual approaches of avoiding overflights can now be solved:

$$\begin{aligned} \text{ABAO} &= \text{ANAO} \times \text{CAO} \\ &= \text{GATN} \times \text{FA} \times \text{FVC} \times \text{FO} \times \text{CAO} \\ &= \text{GATN} \times 0.50 \times 0.968 \times 0.195 \times \$.70 \\ &= \text{GATN} \times \$.0661 \end{aligned}$$

As in the analysis of AWOS safety benefits discussed earlier in Section C-2-b of this chapter, local approaches are likely to benefit from AWOS as well as itinerant approaches, although to a lesser extent. Pilots in many local approaches, such as local practice approaches and touch-and-go's, are likely to have some foreknowledge of prevailing winds and preferred landing direction. Based on the logic used in Section C-2-b, the benefits to local operations are accorded 60 percent of those for itinerant operations. Applying these logic, the annual benefits to general aviation visual approaches per local and itinerant operation become:

\$.0661 per GATN, and
\$.0397 per GALCL

d. Military

Because the characteristics of military aircraft which use civil non-towered and non-federal towered airports are reasonably akin to those of general aviation aircraft (at least within the accuracy of this analysis), the benefits of reduced flight disruptions derived in this chapter for the general aviation user class are also ascribed to the military user class. As with reported counts of annual instrument approaches (AIA's) of general aviation aircraft at non-towered airports, reported AIA's of military aircraft may also be questionable. To guard against this possibility, benefits attributable to reduced military instrument flight disruptions are also denominated in per itinerant operation terms and will apply only to those candidate sites with existing standard instrument approach procedures (SIAP's) or potential SIAP's as the result of installing AWOS.

4. Proximity Penalty and Remoteness Premium

a. Proximity Penalty

Other things being equal, the introduction of an AWOS at an airport which is relatively distant from a surface weather observing station is more beneficial than the introduction of one at an airport which is located relatively close to a surface weather observation station. For example, assume 100 miles separates Airport A from the nearest weather observation station, Site B. Further assume that only 5 miles separates Airport X from its nearest weather observation station, Site Y. Other things being equal, one would expect the actual benefits of a weather observing system at Airport A to exceed those at Airport X.

To compensate for this proximity function and to enhance the ability of the criteria developed in the report to identify the most observing candidate sites for AWOS, a "proximity penalty" is established. Under this provision, the safety and flight disruption benefits of a proposed non-towered or non-federal towered candidate airport for AWOS may be limited depending upon its proximity to neighboring surface weather observation stations. It is postulated that a non-towered or non-federal towered candidate airport for AWOS that is located less than 10 nautical miles from a full-time, non-automated FAA/NWS/NWS Contract surface weather observation station should be credited with only 50 percent of its computed safety and efficiency benefits, except in instances of precipitous terrain or non-homogeneous weather. Conversely, any candidate non-towered or non-federal towered airport that is 10 or more nautical miles from the nearest full-time non-automated surface weather observation station, or whose weather is non-homogeneous with that weather observation station, or which is located in precipitous terrain, should be given full credit for its computed safety and efficiency benefits.

b. Remoteness Premium

In contrast to the proximity penalty, an airport far removed from the nearest surface weather observation station will be credited with a premium in consideration of its remoteness. Provision of surface weather observations at remote locations previously without such service benefits not only aviation users but also nonaviation users since society benefits from an enhanced regional and national synoptic weather forecasting capability. It is postulated that a non-towered or non-federal towered candidate airport for AWOS that is located more distant than the current national average distance between FAA/NWS weather observation stations, or 90 miles as derived below, from the nearest full-time, non-automated FAA/NWS/NWS Contract surface weather observation station should be given a premium mark-up of 25 percent on its computed safety and efficiency benefits. In addition to this AWOS remoteness penalty, certain very remote locations may receive still more compensation for their remoteness through the remoteness compensation provisions in Airway Planning Standard Number One (Reference 1) and Remoteness-Compensation Methodology For Benefit/Cost Establishment and Discontinuance Criteria (Reference 34). These latter references provide benefit-enhancement

premiums for a very few sites where relatively large numbers of citizens are without alternative transportation links to the outside world for extended periods of time. Figure 30 derives 6,456 square miles as the national average geographic area covered per FAA and NWS weather observation station. The average distance between observation stations may be approximated by solving for the diameter of a circle representing 6,456 square miles or twice the radius:

$$\pi r^2 = 6,456 \text{ square miles}$$

$$r^2 = 6,456/3.14$$

$$r = 45.34$$

$$2r = 90.68$$

1

FIGURE 30

Area Covered Per FAA/NWS Weather Observation Station

FAA Region	Square Miles ^{1/}	Number of Stations ²				Total	Square Miles Per Station
		ATCT		FSS			
		FAA	NWS	FAA	NWS		
Alaskan (AAL)	589,757	2	4	17	7	30	19,659
Central (ACE)	285,467	7	11	18	3	39	7,320
Eastern (AEA)	180,444	12	23	23	4	62	2,910
Great Lakes (AGL)	480,063	29	29	28	4	90	5,334
New England (ANE)	66,608	14	4	5	1	24	2,775
Northwest Mountain (ANM)	682,945	14	21	30	1	66	10,348
Southern (ASO)	386,609	24	33	36	1	94	4,113
Southwest (ASW)	560,550	22	22	33	2	79	7,096
Western-Pacific (AWP)	389,592	37	13	26	1	77	5,060
Total	3,622,035	161	160	216	24	561	6,456

^{1/}Includes continental United States, Alaska, Hawaii, Puerto Rico, and Virgin Islands. Excludes South Pacific and Canal Zone. Source: Reference 35.

^{2/}Source: Reference 2.

5. Summary

Figure 31 summarizes the expected annual quantified benefits of AWOS per aviation activity unit, as derived in this chapter.

FIGURE 31

Summary of Expected Annual Benefits of AWOS at Non-Towered and Non-Federal Towered Airports Per Aviation Activity Unit

<u>Nature of Benefit</u>	<u>Required Sensor</u>	<u>Benefit Per Aviation Activity Unit By User Class</u>	
		<u>Air Carrier and Air Taxi</u>	<u>General Aviation and Military Per Min. Opn. Per Local Opn.</u>
Safety (Prevented Accidents By Weather Phenomenon)	Unfavorable Winds and Wrong Runway	Wind	\$.1963 \$.1178
	Temperature/Dew Point	Temperature/Dew Point	\$.0025 \$.0015
	Low Ceiling/Visibility	Ceiling/Visibility	\$1.064 1/ -
	Rain, Hydroplaning, Wet Runway	Precipitation	\$.0045 \$.0027
	Thunderstorms	Thunderstorm	\$.0007 \$.0004
	Thunderstorms	Thunderstorm	\$.0007 \$.0004
Efficiency			
Avoidance of SARWS Costs			\$9,548/Number of AC + AT Operations
Reduced Disruptions to Instrument Flights	Altimeter		\$.1488 1/ -
Reduced Disruptions to Visual Flights	Wind		\$.0661 \$.0397
<u>Total Direct Benefits</u>			<u>Sum of Applicable Benefits x Adjustment Reciprocal 2/</u>

1/Applies only to locations with actual or "would-be" standard instrument approach procedures.
 2/Adjusting Penalty or Premium Reciprocal:

- Proximity Penalty Reciprocal = .50. Applies to candidate airports located in non-precipitous terrain and less than 10 nautical miles from a full-time, non-automated surface weather observation station operated by the FAA, the NWS or under NWS contract when both locations have homogeneous weather.
- Remoteness Premium Reciprocal = 1.25. Applies to candidate airports that are located 90 or more nautical miles from the nearest full-time, non-automated FWA/NWS/NWS contract surface weather observation station.
- Adjustment reciprocal for all other candidate airports = 1.

D. Indirect Benefits

1. Introduction

In addition to the direct benefits of AWOS addressed up to this point--safety benefits and efficiency benefits--there remain a number of other important benefits which are termed "indirect" or "intangible" benefits in this report. These benefits include safer and more efficient route selection, improved quality of weather information, contribution to the weather communications network, benefits to departing and enroute aircraft, congestion relief at major airports and accident investigation. Attribution of these benefits to specific sites is questionable. Therefore, they are considered in this report qualitatively rather than in quantitative terms.

2. Nature of Indirect Benefits

- a. Benefits to Departing and Enroute Aircraft. Sections C-2 and C-3 earlier in this chapter address the safety and efficiency benefits that can be expected to accrue to approaching aircraft at non-towered and non-federal towered airports as a result of an operating AWOS. In addition to approaching aircraft, AWOS may benefit departing and enroute aircraft as well. Although departing pilots should generally have adequate knowledge of prevailing weather at the departure airport, the availability of weather observation data enhances the ability of a pilot to plan for and execute the safest and most efficient route, weather-wise. But as with the other indirect benefits described in this section, these benefits are not easily evaluated with respect to criteria application. Enroute benefits, especially, are difficult, if not impossible, to ascribe site-specifically.
- b. Improved Quality of Weather Information. AWOS, as compared with manual weather observing systems, can be expected to improve the quality of weather information. Weather information gathered and disseminated by a manual weather observation site, because of its labor intensive nature, may be unavailable if the observing site is closed, be aged depending on the frequency of observations, and be subject to variances in consistency. AWOS, on the other hand, is capable of providing continuously available, real time and consistent observations.
- c. Contribution to the Weather Communications Network. Any addition to the weather communications network benefits not only aviation users but also non-aviation users since society benefits from an enhanced regional and national synoptic weather forecasting capability.
- d. Reduced Workload of Flight Service Stations. The demand for services being levied on flight service stations (FSS's) is great and is forecast to increase over the next several years. A study of the FSS system under the joint auspices of the FAA and the Department of Defense (Reference 36) indicates that further accelerated demands on the presently constituted system could result in an unacceptable deterioration in the quality and quantity of FSS services. This condition is one of several which has led to planning for future

automation of the FSS network. It will be several years, however, until the network is fully automated. In the interim, implementation of AWOS will reduce the workload burden of FSS's. As indicated in several other parts of this report, locations with an automated flight service station which is obligated to take weather observations automatically qualify for AWOS establishment. Other FSS locations qualify if they satisfy the benefit/cost-based criteria developed in the report and published in Airway Planning Standard Number One (Reference 1).

- e. Congestion Relief at Major Airports. Airspace capacity problems exist today at several U.S. airports, primarily in the busy hub areas. Terminal airspace capacity is limited by the physical layout of many airports and by the ability of the air traffic control system to meter and space aircraft for safe operations. The expanded use of satellite or reliever airports in metropolitan areas is one of several alternatives often considered as an efficient method of relieving increasing traffic congestion at primary air terminals. Significant diversions of traffic to satellite airports are hindered, however, by the lack of incentives to draw traffic away from the primary terminals. Provision of weather observing systems at satellite airports is thought to provide some incentive to attract aircraft away from primary terminals in two ways. First, as discussed in other sections of this chapter, FAR Parts 121 (for air carrier operators) and 135 (for air taxi operators) prohibit instrument operations at airports which do not have approved weather observation services. Implementation of AWOS at a satellite airport previously without a weather observation service, therefore, would at least open and hopefully attract commercial operators to the airport. Second, private general aviation pilots may be attracted to satellite airports if they can be provided with adequate weather information. Other things being equal, they may be induced to minimize the risk of delay associated with many hub airports by utilizing satellite airports.
- f. Accident Investigation. Since AWOS is capable of storing and retrieving weather information, benefits may potentially accrue to aircraft accident investigations.

CHAPTER V - DEVELOPMENT OF PHASE I CRITERIA FOR NON-TOWERED
AND NON-FEDERAL TOWERED AIRPORTS

In this chapter, Phase I screening criteria for non-towered and non-federal towered airports are derived for incorporation in Airway Planning Standard Number One (Reference 1). Phase I criteria are generalized criteria designed to initially identify potential candidates. These criteria are easily applied with available data and without the aid of a computer. Phase II is a site-specific computerized benefit/cost screening process against which candidates identified under Phase I are further evaluated. Figures 34-A and 34-B of Chapter VI provide computer-generated Phase I and II benefit/cost ratios (before proximity penalty or remoteness premium, if any) for over 3,100 non-towered, non-federal towered and FAA tower discontinuance candidate civil airports in the Terminal Area Forecast Data System.

AWOS may be tailored to meet site-specific needs. For example, at a particular site, certain weather sensors, certain output media, the telephone answering device or long line communications may not be required. In recognition of this possibility, both Phase I and II criteria are developed modularly in this report. In this way, a benefit/cost ratio can be easily computed for any given AWOS configuration. At the date of this report, the typical AWOS configuration is projected by the FAA AWOS Program Office to include sensors for wind direction and speed, temperature, dew point, ceiling, visibility and liquid precipitation. However, future configurations may include additional or fewer sensors. For example, a cloud height (ceiling sensor) may not be justified at certain locations in close proximity to another observation site, while additional sensors, such as for freezing precipitation and thunderstorm, may be added if cost effective.

As explained earlier, many locations cannot utilize a remote altimeter setting source and are therefore restricted from having instrument approaches. Assuming the lack of an on-site altimeter setting source is the sole reason for the absence of an approved standard instrument approach procedure, the introduction of AWOS could lead to the approval of instrument procedures. Therefore, two sets of Phase I criteria are developed in this section: one set for non-towered and non-federal towered airports with existing standard instrument approach procedures or locations currently without instrument approach procedures solely because of the absence of an on-site altimeter setting source, and another set for all other non-towered and non-federal towered airports.

For the air carrier and air taxi user classes, Section C-3-b of Chapter IV derived a range of annual benefits based on a sliding scale ranging from a high of \$9,548 (for 3,000 or more annual operations) to a low of zero (where there are no air carrier or air taxi operations). The life-cycle benefits accruing to these user classes can be expressed as:

$$\sum_{n=1}^{15} \left(\frac{\text{Lesser of } ((ACITN + ATITN) \text{ or } (3,000))}{3,000} \times \frac{\$9,548}{(1+i)^{n-.5}} \right)$$

where 'n' is each year of an assumed economic life of 15 years, ACITN and ATTN are the respective numbers of annual air carrier and air taxi itinerant operations, 3,000 is the activity level at or above which characterizes locations with SAWRS, and \$.0394 is the quotient of $3,000/(\$9,548 \times 7.976)$. In the later expression 3,000 is the activity break point, \$9,548 is the annualized cost of a SAWRS, and 7.976 is the life-cycle discount factor (present value of a uniform series of $\$1:((1+i)^n-1)/i(1+i)^n$ for $n = 1$ to 15 where 'i' is the OMB-prescribed discount rate of 10 percent and 'n' is each year of an assumed economic life of 15 years).

The Phase I benefit/cost ratio life-cycle equivalent for the general aviation and military user classes is simply the quotient of (1) the product of the total first year benefits, the net discount factor with which first year benefits can be inflated to their life-cycle equivalent, and the proximity penalty or remoteness premium (if any), and (2) the life-cycle cost of the AWOS proposed for the airport in question. These procedures are displayed and summarized in Figures 32 and 33.

It is important that there be a close relationship between the results of Phase I and Phase II. If not, one or both of two undesirable situations can occur. First, locations may show up as candidates under Phase I but fail to reflect an acceptable benefit/cost ratio under Phase II, a situation which is termed "false alarm." Secondly, but more critically, locations may not show up as candidates under Phase I but attain a benefit/cost ratio of 1 or more under Phase II screening, a situation termed "non-identification." In the development of the Phase I establishment criteria, the emphasis was to minimize the non-identification rate but still maintain a reasonable relationship between the benefit/cost ratios derived from both phases.

When an AWOS installation is being considered for discontinuance, initial acquisition and installation costs are irrelevant since they are sunk costs. The only relevant costs are recurring operations and maintenance costs (ignoring salvage costs, relocation costs, etc.). To determine whether a system qualifies for discontinuance, a ratio value is calculated by the applicable approach described above for Phase I establishment criteria. If the ratio value so obtained is less than 0.45, the location satisfies Phase I discontinuance criteria. This figure is an approximation of the level where the remaining life-cycle benefits just offset recurring life-cycle operations and maintenance costs.

FIGURE 32

Methodology for Phase I Establishment Criteria for AWOS at Non-Towered and Non-Federal Towered Airports

User Class	Total First-Year Benefits/ (Lesser of (ACITN+ATITN) or (3,000)) x \$9,548 3,000	Life-Cycle Benefits Inflator	Product or Quotient
Air Carrier and Air Taxi		7.976	\$xxxx
General Aviation and Military			
Wind Sensor	\$.2624 x (GAITN+MILITN) + \$.1575x (GALCL+MILLCL)	14.500	\$xxxx
Temperature/Dew Point Sensors	\$.0025 x (GAITN+MILITN) + \$.0015x (GALCL+MILLCL)	14.500	\$xxxx
Altimeter Sensor	\$.1488 x (GAITN+MILITN)	14.500	\$xxxx
Ceiling and Visibility Sensors	\$1.0640 x (GAITN+MILITN)	14.500	\$xxxx
Precipitation Sensor (s)	\$.0045 x (GAITN+MILITN) + \$.0027x (GALCL+MILLCL)	14.500	\$xxxx
Thunderstorm Sensor	\$.0007 x (GAITN+MILITN) + \$.0004x (GALCL+MILLCL)	14.500	\$xxxx

Phase I Value

$$\frac{\text{Sum of Applicable Benefits} \times \text{AR}^2}{\text{Life-Cycle Cost From Figure 4}}$$

1/Source: Figure 31

2/Adjustment Reciprocal (AR):

- Proximity Penalty Reciprocal = .50. Applies to candidate airports located in non-precipitous terrain and less than 10 nautical miles from a full-time, non-automated surface weather observation station operated by the FAA, the NWS or under NWS contract when both locations have homogeneous weather.
- Remoteness Premium Reciprocal = 1.25. Applies to candidate airports that are located 90 or more nautical miles from the nearest full time, non-automated FAA/NWS contract surface weather observation station.
- Adjustment reciprocal for other candidate airports = 1.

FIGURE 33

Phase I Establishment Criteria for AWOS at Non-Towered and Non-Federal Towered Airports

<u>User Class</u>	<u>Airports With Existing Standard Instrument Approach Procedures (SIAP) or With Prospective SIAP With AWOS</u>		<u>Other Non-Towered and Non-Federal Towered Airports</u>		<u>Product</u>
	<u>Air Carrier and Air Taxi</u>	<u>Lesser of (ACTN+ATTN) or (3,000) \$.0394</u>	<u>(Lesser of (ACTN+ATTN) or (3,000)) x \$25.38</u>		
<u>General Aviation and Military</u>					
Wind Sensor	\$ 3.80x (GATN+MLITN) +\$2.28x (GALCL+MLLCL)		\$3.80x (GATN+MLITN) +\$2.28x (GALCL+MLLCL)		= \$xxxx
Temperature/Dew Point Sensors	\$.04x (GATN+MLITN) +\$.02x (GALCL+MLLCL)		\$.04x (GATN+MLITN) +\$.02x (GALCL+MLLCL)		= \$xxxx
Altimeter Sensor	\$ 2.16x (GATN+MLITN)		\$0.00x (GATN+MLITN)		= \$xxxx
Ceiling/Visibility Sensors	\$15.43x (GATN+MLITN)		\$0.00x (GATN+MLITN)		= \$xxxx
Precipitation Sensor (s)	\$.06x (GATN+MLITN) +\$.04x (GALCL+MLLCL)		\$.06x (GATN+MLITN) +\$.04x (GALCL+MLLCL)		= \$xxxx
Thunderstorm Sensor	\$.01x (GATN+MLITN) +\$.01x (GALCL+MLLCL)		\$.01x (GATN+MLITN) +\$.01x (GALCL+MLLCL)		= \$xxxx

Phase I Value

(If 1.0 or greater, location satisfies Phase I establishment criteria.)

(Sum of Applicable Benefits x AR
Life Cycle Cost From Figure 4)

CHAPTER VI - RESULTS OF APPLYING CRITERIA TO NON-TOWERED AIRPORTS,
NON-FEDERAL TOWERED AIRPORTS AND ATCT DISCONTINUANCE CANDIDATES

The computer program described in Appendix C, based on the benefit/cost methodology described in Chapters III, IV-C and V, was used to compute benefit/cost ratios for approximately 3,300 non-towered and non-federal towered civil airports and 50 FAA towered airports tentatively identified as tower discontinuance candidates by Reference 11 based on the Terminal Area Forecasts (TAF) over the 15-year period Fiscal Years 1981 through 1995. The results are outlined in Figures 34-A (for non-towered and non-federal towered civil airports) and 34-B (for tentatively-identified FAA ATCT discontinuance candidates). Locations where surface weather observations are currently provided by or under contract with the National Weather Service are not listed. Figure 34-A is sequenced by Region-State and descending Phase II benefit/cost ratio and Figure 34-B is sequenced by location identifier code. Statistical summaries are provided at the ends of Figures 34-A and 34-B.

Figures 34-A and 34-B presume installation and corresponding life-cycle costs and benefits of AWOS with sensors for wind direction and speed, temperature, dew point, altimeter, ceiling, visibility and liquid precipitation. While this is the typical AWOS configuration envisioned by the AWOS Program Office as of the date of this report, future configurations may include additional or fewer sensors. For example, a cloud height (ceiling) sensor may not be justified at certain locations in close proximity to another observation site, while additional sensors, such as for freezing precipitation and thunderstorms, may be added if cost effective.

It may be recalled from Chapter IV that while benefits of altimeter, ceiling and visibility sensors are functions of annual instrument approaches (AIA's), they are denominated in per itinerant terms in the criteria because reported AIA counts at many airports are often inaccurate and unreliable. The results in Figures 34-A and 34-B allow for these benefits as a function of itinerant operations only if the TAF reflects a positive value for AIA's. If the AIA fields in the TAF read zero, these benefits are suppressed. This same procedure will apply in actual application of the criteria. In the relatively few instances where the installation of AWOS would lead to the approval of instrument approach procedures where theretofore there were none, this suppression will not be applied in actual practice.

Finally, Figures 34-A and 34-B do not reflect any proximity penalty or remoteness premium that might be applicable as a result of the airport's proximity to or remoteness from other surface weather observation stations.

FIGURE 34-A

RESULTS OF APPLYING CRITERIA TO NON-TOWERED AND NON-FAA TOWERED CIVIL AIRPORTS
(SITES WHERE NWS CURRENTLY OBSERVES WEATHER ARE EXCLUDED)

REG	LOCID	AIRPORT NAME	CITY	ST	LC SAFETY BENS	LC EFFCY BENS	GA+MI AIA'S YR 1	PHASE I B/C#	PHASE II B/C
ALASKAN REGION									
AAL	OTZ	RALPH WIEN MEMORIAL	KOTZEBUE	AK	1209024.	293728.	1169.	5.29	9.98
AAL	UMT	UMIAT	UMIAT	AK	442469.	179060.	413.	3.61*	4.13*
AAL	ANI	ANIAK	ANIAK	AK	229446.	141113.	233.	1.44	2.46
AAL	TKA	TALKEETNA	TALKEETNA	AK	211891.	116827.	197.	1.84*	2.18*
AAL	SXQ	SOLDOTNA	SOLDOTNA	AK	152541.	155150.	0.	6.03	2.04
AAL	PAQ	PALMER MUNI	PALMER	AK	110327.	141374.	0.	1.56	1.67
AAL	BIT	BETTLES	BETTLES	AK	104053.	139323.	0.	4.64	1.62
AAL	CDV	CORDOVA-MILE 13	CORDOVA	AK	110951.	123518.	141.	0.93	1.56
AAL	DLG	DILLINGHAM	DILLINGHAM	AK	90824.	135002.	0.	4.95	1.50
AAL	Z15	BIRCHWOOD	BIRCHWOOD	AK	99572.	119931.	0.	1.25	1.46
AAL	WSN	SOUTH NAKNEK NR 2	SOUTH NAKNEK	AK	73353.	129304.	0.	1.20	1.35
AAL	SNK	NAKNEK	NAKNEK	AK	68308.	127657.	0.	1.16	1.30
AAL	KTN	KETCHIKAN INTL	KETCHIKAN	AK	71519.	120720.	48.	2.00	1.28
AAL	HOM	HOMER	HOMER	AK	57894.	123776.	1.	2.29	1.21
AAL	SIT	SITKA	SITKA	AK	52198.	123041.	3.	3.15	1.20
AAL	ORT	NORTHWAY	NORTHWAY	AK	52122.	118244.	201.	1.81	1.13
AAL	FWL	FAREWELL	FAREWELL	AK	69152.	92377.	65.	0.74*	1.07*
AAL	PTH	PORT HEIDEN	PORT HEIDEN	AK	43567.	100364.	42.	0.41*	0.96*
AAL	GKN	GULKANA	GULKANA	AK	27050.	114192.	0.	1.55	0.94
AAL	SKE	KETCHIKAN HARBOR	KETCHIKAN	AK	26561.	114066.	0.	0.75	0.94
AAL	MTF	METRO FLD	FAIRBANKS	AK	41641.	94627.	0.	0.67	0.91
AAL	Z20	EMMONAK	EMMONAK	AK	22164.	112569.	0.	0.72	0.90
AAL	FYU	FORT YUKON	FORT YUKON	AK	22394.	112651.	1.	1.49	0.90
AAL	ILI	ILIAMNA	ILIAMNA	AK	21562.	112402.	0.	0.71	0.89
AAL	GST	GUSTAVUS	GUSTAVUS	AK	42803.	89556.	42.	0.55*	0.88*
AAL	WRG	WRANGELL	WRANGELL	AK	20956.	112202.	0.	1.58	0.88
AAL	PII	PHILLIPS FIELD	FAIRBANKS	AK	19783.	111820.	0.	0.69	0.87
AAL	SWD	SEWARD	SEWARD	AK	15152.	110308.	0.	0.65	0.83
AAL	CKU	CORDOVA MUNI	CORDOVA	AK	12812.	109545.	0.	0.62	0.81
AAL	KDK	KODIAK MUNI	KODIAK	AK	11564.	109139.	0.	0.62	0.80
AAL	KSM	ST MARYS	ANDREAFSKY /ST MARYS/	AK	9043.	108314.	0.	0.91	0.78
AAL	ORV	ROBERT /BOB/ CURTIS MEML	NOORVIK	AK	7959.	107865.	0.	0.58	0.77
AAL	Z16	WASILLA	WASILLA	AK	8031.	107321.	0.	0.56	0.77
AAL	TAL	RALPH M CALHOUN MEML	TANANA	AK	7418.	107784.	0.	0.58	0.77
AAL	522	NORTH DOUGLAS	JUNEAU	AK	8914.	107610.	0.	0.57	0.77
AAL	TSG	TANACROSS	TANACROSS	AK	6660.	107537.	0.	0.57	0.76
AAL	PIP	PILOT POINT	PILOT POINT	AK	9624.	104126.	0.	0.51	0.76
AAL	SOV	SELDOVIA	SELDOVIA	AK	6975.	107640.	0.	0.57	0.76
AAL	ENN	NENANA MUNI	NENANA	AK	8432.	106660.	0.	0.54	0.76
AAL	ARC	ARCTIC VILLAGE	ARCTIC VILLAGE	AK	6121.	107361.	0.	0.56	0.75
AAL	KKA	KOYUK	KOYUK	AK	4380.	106793.	0.	0.55	0.74
AAL	OLH	OLD HARBOR	OLD HARBOR	AK	4088.	106697.	0.	0.54	0.74
AAL	WLK	SELAWIK	SELAWIK	AK	1752.	105935.	0.	0.52	0.72
AAL	PUO	PRUDHOE BAY	PRUDHOE BAY	AK	1728.	105928.	0.	0.52	0.72

[illegible]

AAL	RDV	RED DEVIL	AK	5247.	57431.	0.	0.23	0.42
AAL	AK86	NAPAKIAK	AK	1499.	62139.	0.	0.21	0.42
AAL	ELI	ELIM	AK	1460.	58017.	0.	0.22	0.40
AAL	MHM	MINCHUMINA	AK	2921.	3212.	0.	0.40	0.40
AAL	Z10	KONGIGANAK	AK	3503.	55852.	0.	0.22	0.40
AAL	PSG	PETERSBURG	AK	1513.	57663.	0.	0.31	0.39
AAL	KLK	KALSKAG	AK	1567.	57733.	0.	0.25	0.39
AAL	RSH	RUSSIAN MISSION	AK	2508.	54768.	0.	0.22	0.38
AAL	AK85	KWIGILLINGOK	AK	1460.	56195.	0.	0.20	0.38
AAL	DKK	DAHL CREEK	AK	585.	5910.	0.	0.19	0.37
AAL	KLL	LEVELOCK	AK	2594.	52447.	0.	0.22	0.37
AAL	AK87	NEWTOK	AK	438.	55862.	0.	0.19	0.37
AAL	LNI	LONELY DEW STATION	AK	43417.	11281.	18.	0.33*	0.36*
AAL	KNJ	NEW STUYAHOK	AK	2045.	48030.	0.	0.21	0.33
AAL	WKK	ALEKNAGIK	AK	3180.	46961.	0.	0.20	0.33
AAL	BLG	BELUGA	AK	14769.	32704.	0.	0.23	0.32
AAL	SHG	SHUNGNAK	AK	457.	46098.	0.	0.19	0.31
AAL	DUT	DUTCH HARBOR	AK	349.	46269.	2.	0.21	0.31
AAL	Z25	CHENA RIVER	AK	16410.	30015.	0.	0.23	0.31
AAL	SMK	ST MICHAEL	AK	1134.	45550.	0.	0.18	0.31
AAL	SDP	SAND POINT	AK	2548.	42884.	0.	0.20	0.30
AAL	KGK	NEW KOLIGANEK	AK	1752.	41313.	0.	0.16	0.29
AAL	MDR	MEDFRA	AK	1451.	42215.	0.	0.15	0.29
AAL	KKU	EKUK	AK	2508.	40287.	0.	0.17	0.28
AAL	CDL	CANDLE	AK	877.	39988.	0.	0.15	0.27
AAL	Z03	EGEGIK /NEW/	AK	9372.	30943.	0.	0.18	0.27
AAL	EAA	EAGLE	AK	4885.	35434.	0.	0.17	0.27
AAL	17Z	MANOKOTAK	AK	585.	39142.	0.	0.13	0.26
AAL	PKA	NAPAISSAK	AK	876.	37492.	0.	0.14	0.25
AAL	VAK	CHEVAK	AK	876.	36070.	0.	0.15	0.25
AAL	95Z	BRADLEY SKY-RANCH	AK	4497.	32292.	0.	0.14	0.24
AAL	51Z	MINTO /NEW/	AK	6357.	29959.	0.	0.15	0.24
AAL	Z74	CHEFORNAK	AK	1460.	33919.	0.	0.12	0.24
AAL	SKK	SHAKTOOLIK	AK	291.	36082.	0.	0.15	0.24
AAL	KEB	ENGLISH BAY	AK	1896.	34062.	0.	0.13	0.24
AAL	4Z4	HOLY CROSS	AK	462.	33594.	0.	0.12	0.23
AAL	OBU	KOBUK /WIEN/	AK	5247.	29458.	0.	0.15	0.23
AAL	Z60	AMBLER	AK	5515.	29684.	0.	0.14	0.23
AAL	WBQ	BEAVER	AK	1460.	31916.	0.	0.14	0.22
AAL	SVS	STEVENS VILLAGE	AK	1460.	30125.	0.	0.13	0.21
AAL	AIN	WAINWRIGHT	AK	1776.	29743.	2.	0.13*	0.21*
AAL	CXC	CHITINA	AK	3114.	28901.	0.	0.12	0.21
AAL	AK54	TELLER	AK	2508.	28703.	0.	0.12	0.21
AAL	AK04	PEDRO BAY	AK	1607.	28408.	0.	0.11	0.20
AAL	ANV	ANVIK	AK	1806.	28474.	0.	0.11	0.20
AAL	AKP	ANAKTUVUK PASS	AK	1460.	28363.	0.	0.11	0.20
AAL	5NN	NONDALTON	AK	2067.	28559.	0.	0.11	0.20
AAL	KFP	FALSE PASS	AK	1607.	28408.	0.	0.11	0.20
AAL	KCL	CHIGNIK LAGOON	AK	1630.	28416.	0.	0.11	0.20
AAL	15Z	MCCARTHY NR 2	AK	2033.	23548.	0.	0.11	0.20
AAL	TKJ	TOK	AK	1686.	28435.	0.	0.11	0.20
AAL	CYT	YAKATAGA	AK	1633.	28424.	0.	0.11	0.20
AAL	Z46	MEADE RIVER	AK	89.	27913.	0.	0.09	0.19
AAL	PGM	PORT GRAHAM	AK	585.	28075.	0.	0.10	0.19
AAL	AK10	PILOT STATION	AK	585.	28077.	0.	0.10	0.19
AAL	AK79	CHIGNIK LAKE	AK	620.	28087.	0.	0.10	0.19
AAL	RMP	RAMPART	AK	730.	23666.	0.	0.12	0.19
AAL	SRV	STONY RIVER 2	AK	0.	23122.	0.	0.10	0.19
AAL	SLQ	SLEETMUTE	AK	438.	27884.	0.	0.09	0.19
AAL	CIK	CHALKYITSIK	AK	0.	26674.	0.	0.11	0.18

AAL	KYT	KARLUK	KARLUK	AK	150.	27446.	0.	0.12	0.18
AAL	KWT	KWETHLUK	KWETHLUK	AK	291.	25273.	0.	0.10	0.17
AAL	Z79	CHIGNIK	CHIGNIK	AK	4380.	20940.	0.	0.11	0.17
AAL	Z74	PHLOS	WASILLA	AK	4149.	19849.	0.	0.10	0.16
AAL	LS	STEBBINS	STEBBINS	AK	291.	23742.	0.	0.10	0.16
AAL	LS	LOST RIVER 1	LOST RIVER	AK	291.	22341.	0.	0.08	0.15
AAL	SQL	THE QUEENS	QUEENS	AK	1607.	17283.	0.	0.07	0.13
AAL	KTS	TRILLIS MISSION	TELLER MISSION	AK	150.	18666.	0.	0.08	0.13
AAL	Z38	SKY HARBOR	ANCHORAGE	AK	13331.	4352.	0.	0.12	0.12
AAL	Z41	LAKA HOOD STRIP	ANCHORAGE	AK	11645.	6891.	0.	0.12	0.12
AAL	AK45	TUNUNAK	TANUNAK	AK	876.	17045.	0.	0.06	0.12
AAL	AKI	AKIAK	AKIAK	AK	60.	15057.	0.	0.06	0.10
AAL	MYU	MEKORYUK	MEKORYUK	AK	756.	14973.	0.	0.07	0.10
AAL	Z13	AKIACHAK	AKIACHAK	AK	1047.	14243.	0.	0.06	0.10
AAL	UGA	UGASHIK	UGASHIK	AK	2045.	12222.	0.	0.06	0.10
AAL	SKW	SKWENTNA	SKWENTNA	AK	5501.	8043.	5.	0.07	0.09
AAL	KVC	KING COVE	KING COVE	AK	876.	11727.	0.	0.04*	0.09*
AAL	TLT	TULUKSAK	TULUKSAK	AK	673.	12099.	0.	0.05	0.08
AAL	HAY	HAYCOCK	HAYCOCK	AK	291.	11295.	0.	0.04	0.08
AAL	CKX	CHICKEN	CHICKEN	AK	2594.	9141.	0.	0.05	0.08
AAL	AK14	PORTAGE CREEK	PORTAGE CREEK	AK	876.	11436.	0.	0.05	0.08
AAL	24AK	NIGHTMUTE	NIGHTMUTE	AK	150.	12379.	0.	0.04	0.08
AAL	2AK9	INDEPENDENCE CREEK	INDEPENDENCE CREEK	AK	450.	9403.	0.	0.03	0.07
AAL	HNH	HOONAH	HOONAH	AK	8458.	2760.	0.	0.08	0.07
AAL	WCR	CHANDALAR LAKE	CHANDALAR	AK	3091.	6550.	0.	0.05	0.06
AAL	MYK	MAY CREEK	MAY CREEK	AK	585.	8504.	0.	0.03	0.06
AAL	Z95	COUNCIL (PEDERSON)	COUNCIL	AK	818.	8561.	0.	0.04	0.06
AAL	Z22	WILLOW	WILLOW	AK	3787.	5737.	0.	0.05	0.06
AAL	WSM	WISEMAN	WISEMAN	AK	425.	6824.	0.	0.03	0.05
AAL	ZNC	NYAC	NYAC	AK	89.	6692.	0.	0.02	0.05
AAL	9Z1	KLAUOCK	KLAUOCK	AK	1460.	6017.	0.	0.03	0.05
AAL	STE	TETLIN	TETLIN	AK	526.	5713.	0.	0.02	0.04
AAL	SHX	SHAGELUK	SHAGELUK	AK	876.	5827.	0.	0.03	0.04
AAL	Z84	CLEAR	CLEAR	AK	4775.	1558.	0.	0.05	0.04
AAL	BYA	BOUNDARY	BOUNDARY	AK	438.	5684.	0.	0.02	0.04
AAL	AK05	PERRYVILLE	PERRYVILLE	AK	585.	5732.	0.	0.02	0.04
AAL	NFV	POINT BARROW	POINT BARROW	AK	1372.	3539.	0.	0.02	0.03
AAL	0Z4	DILLINGHAM CITY STRIP	DILLINGHAM	AK	2998.	978.	0.	0.03	0.03
AAL	5HO	HOPE	HOPE	AK	539.	3267.	0.	0.01	0.03
AAL	PCX	PORCUPINE CREEK	PORCUPINE CREEK	AK	150.	2925.	0.	0.01	0.02
AAL	Z17	OPHIR	OPHIR	AK	44.	2890.	0.	0.01	0.02
AAL	PIZ	POINT LAY DEW STATION	POINT LAY	AK	224.	3285.	1.	0.01	0.02
AAL	CZN	CHISANA	CHISANA	AK	291.	2971.	0.	0.01	0.02
AAL	TPO	TANALIAN POINT	TANALIAN POINT	AK	609.	3074.	0.	0.02	0.02
AAL	OLI	OLIKTOK DEW STATION	OLIKTOK POINT	AK	1180.	210.	0.	0.00	0.01
AAL	AK01	BUTTE MUNICIPAL	PALMER	AK	1593.	520.	0.	0.01	0.01

CENTRAL REGION

ACE	CBF	COUNCIL BLUFFS MUNI	IA	1093963.	190760.	1082.	7.02*	8.54*
ACE	MCW	MASON CITY MUNI	IA	991968.	264500.	953.	4.30	8.35
ACE	AMJ	AMES MUNI	IA	937027.	268726.	927.	7.31	8.01
ACE	OTM	OTTUMWA INDUSTRIAL	IA	814347.	233856.	785.	3.36	6.96
ACE	BRL	BURLINGTON MUNI	IA	694590.	216965.	693.	3.81	6.05
ACE	FOD	FORT DODGE MUNI	IA	579880.	199874.	556.	2.76	5.18
ACE	MIW	MARSHALLTOWN MUNI	IA	566626.	157029.	745.	3.73	4.81
ACE	SPW	SPENCER MUNI	IA	491987.	186102.	500.	3.20	4.51
ACE	CWI	CLINTON MUNI	IA	404627.	173914.	364.	2.91	3.84

ACE	MUT	MUSCATINE MUNI	IA	350985	96147	351	2.54	2.97
ACE	TNU	NEWTON MUNI	IA	329095	96207	337	2.14	2.83
ACE	CAV	CLARION MUNI	IA	296638	89439	296	2.07*	2.57*
ACE	CNC	CHARITON MUNI	IA	290042	69866	271	1.89*	2.32*
ACE	ICL	CLARINDA MUNI	IA	272678	69164	275	1.95*	2.27*
ACE	AXA	ALGONA MUNI	IA	189261	145121	143	1.92	2.22
ACE	IOW	IOWA CITY MUNICIPAL	IA	179542	148547	651	3.91	2.18
ACE	SRK	SPIRIT LAKE MUNI	IA	188507	137302	190	1.68*	2.16*
ACE	OXV	KNOXVILLE MUNI	IA	227448	50572	220	1.60	1.85
ACE	K27	FORT MADISON MUNI	IA	132174	128165	131	1.30*	1.73*
ACE	AID	ATLANTIC MUNI	IA	145551	105079	121	1.56	1.67
ACE	RDK	RED OAK MUNICIPAL	IA	195266	46647	178	2.06	1.61
ACE	EBS	WEBSTER CITY MUNI	IA	180943	61610	182	1.23	1.61
ACE	BNW	BOONE MUNI	IA	175311	64556	157	2.11	1.59
ACE	SHL	SHELDON MUNI	IA	165485	73220	160	1.24	1.59
ACE	DEH	DECORAH MUNI	IA	145057	72781	148	1.05	1.45
ACE	CCY	CHARLES CITY MUNI	IA	130971	65947	126	0.99	1.45
ACE	C23	MAQUOKETA MUNI	IA	147657	64538	141	1.10*	1.41*
ACE	ACE	AUDUBON MUNI	IA	89591	21532	84	1.30	1.40
ACE	MXO	MONTICELLO MUNICIPAL	IA	157304	52556	157	1.11*	1.39*
ACE	SLB	STORM LAKE MUNI	IA	161987	36789	154	1.20	1.32
ACE	EST	ESTHERVILLE MUNI	IA	137660	55088	132	1.00	1.28
ACE	LRJ	LEMARS MUNI	IA	158809	32630	144	1.66	1.27
ACE	EFW	JEFFERSON MUNI	IA	135739	50718	123	1.34	1.24
ACE	ORC	ORANGE CITY MUNI	IA	125467	53346	118	0.99	1.19
ACE	DNS	DENISON MUNI	IA	134611	40414	122	1.39	1.16
ACE	POH	POCAHONTAS MUNI	IA	44755	119971	0	2.18	1.09
ACE	ACE	IDA GROVE MUNI	IA	68060	67015	69	0.69*	1.03*
ACE	IDG	PERRY MUNI	IA	121820	32505	135	1.06	1.03
ACE	PRO	CRESTON MUNI	IA	36363	11732	0	1.87	1.02
ACE	CSQ	KEOKUK MUNI	IA	34921	116761	0	0.87	1.01
ACE	EOK	MAPLETON MUNI	IA	96011	51802	86	1.04	0.98
ACE	MEY	ARTHUR N NEU	IA	29896	115121	0	1.62	0.96
ACE	CIN	FOREST CITY MUNI	IA	27928	111688	0	1.54	0.93
ACE	D34	EMMETSBURG MUNI	IA	33443	104906	113	1.08	0.92
ACE	EQQ	HARLAN MUNI	IA	72097	62041	241	1.70	0.89
ACE	HNR	HAVERLY MUNI	IA	54540	71522	203	1.60	0.84
ACE	C25	WAVERLY MUNI	IA	90809	35892	92	0.52	0.84
ACE	OK9	DELWEIN MUNI	IA	95617	27927	94	0.66	0.82
ACE	MPZ	MT PLEASANT MUNI	IA	102281	17776	95	0.62*	0.80*
ACE	SKI	SAC CITY MUNI	IA	101268	17444	96	0.65*	0.79*
ACE	CRZ	CORNING MUNI	IA	17221	100745	0	0.55	0.78
ACE	K21	CENTERVILLE MUNI	IA	82565	28888	73	0.82	0.74
ACE	SDA	SHENANDOAH MUNI	IA	72818	34846	73	0.58*	0.72*
ACE	3Y2	GEORGE L SCOTT MUNI	IA	24059	78507	0	0.49	0.68
ACE	SOY	SIoux CENTER MUNI	IA	19029	82363	0	0.99	0.67
ACE	PEA	PELLA MUNI	IA	46087	49190	0	0.57	0.63
ACE	K22	CHEROKEE MUNI	IA	28988	60417	0	0.48	0.59
ACE	6C5	INDEPENDENCE MUNI	IA	42569	39327	0	1.68	0.54
ACE	FFL	FAIRFIELD MUNI	IA	33647	37069	0	0.43	0.47
ACE	IFA	IOWA FALLS MUNI	IA	40042	23939	0	0.44	0.43
ACE	3Y3	WINTERSET-MADISON COUNTY	IA	20053	31974	0	0.30	0.35
ACE	00A	OSKALOOSA MUNI	IA	40085	13083	0	0.40	0.35
ACE	8C8	FLYERS	IA	17304	32823	0	0.27	0.33
ACE	HFT	HAMPTON MUNICIPAL	IA	34470	14070	0	0.37	0.32
ACE	C17	MARION	IA	29846	12559	0	0.32	0.28
ACE	OK7	HUMBOLDT MUNI	IA	29539	9644	0	0.31	0.26
ACE	Y76	NORTH FIELD /PVT/	IA	25089	13195	0	0.28	0.25
ACE	K28	GREENFIELD MUNI	IA	26222	8559	0	0.26	0.23
ACE	5C2	ANTIQUE AIRFIELD	IA	17770	16301	0	0.22	0.23
ACE	4C8	ALBIA MUNI	IA			0		

ACE	K44	VINTON VETERANS MEML ARPK	VINTON	IA	21157.	11912.	0.	0.24	0.22
ACE	5C8	EKMAN FIELD	DES MOINES	IA	17352.	12462.	0.	0.20	0.20
ACE	5D2	NORTHWOOD MUNI	NORTHWOOD	IA	17763.	11233.	0.	0.20	0.19
ACE	6C8	HUSBAND FIELD	DALLAS CENTER	IA	20395.	7744.	0.	0.21	0.19
ACE	4K6	NICHOLS	LA PORTE CITY	IA	21677.	7075.	0.	0.22	0.19
ACE	D02	BLOOMFIELD MUNI	BLOOMFIELD	IA	16043.	10534.	0.	0.18	0.18
ACE	C61	OSAGE MUNI	OSAGE	IA	19077.	7841.	0.	0.20	0.18
ACE	1Y4	WASHINGTON MUNI	WASHINGTON	IA	19070.	6224.	0.	0.20	0.17
ACE	Y00	NEVADA MUNI	NEVADA	IA	17763.	7432.	0.	0.18	0.17
ACE	K36	ZANGGER	LARCHWOOD	IA	16235.	7474.	0.	0.17	0.16
ACE	K35	ONAMA MUNI	ONAMA	IA	17324.	5654.	0.	0.17	0.15
ACE	Y43	MISSOURI VALLEY	MISSOURI VALLEY	IA	16784.	5478.	0.	0.17	0.15
ACE	0K4	ANITA MUNI-KEVIN	ANITA	IA	15159.	4948.	0.	0.15	0.13
ACE	5C3	EAGLE GROVE MUNI	EAGLE GROVE	IA	8531.	7791.	0.	0.11	0.11
ACE	D03	BEEDS LAKE	HAMPTON	IA	11631.	3796.	0.	0.12	0.10
ACE	2Y4	SIBLEY MUNI	SIBLEY	IA	8156.	6482.	0.	0.10	0.10
ACE	6C0	ROCKWELL CITY MUNI	ROCKWELL CITY	IA	10625.	3468.	0.	0.11	0.09
ACE	1Y9	ELDORA MUNI	ELDORA	IA	8662.	7202.	0.	0.07	0.08
ACE	K37	PAULLINA MUNI	PAULLINA	IA	8412.	2827.	0.	0.09	0.08
ACE	8C4	OSCEOLA MUNI	OSCEOLA	IA	9292.	3290.	0.	0.09	0.08
ACE	7C3	MATHEWS MEMORIAL	TIPTON	IA	9591.	3033.	0.	0.10	0.08
ACE	7C5	MONONA MUNI	MONONA	IA	6657.	3131.	0.	0.10	0.08
ACE	0Y0	SIG FIELD	MONTEZUMA	IA	7144.	2173.	0.	0.07	0.06
ACE	0Y5	GUTHRIE CENTER MUNI	GUTHRIE CENTER	IA	6073.	2332.	0.	0.07	0.06
ACE	Y67	NASH FIELD INDIANOLA	INDIANOLA	IA	6126.	3069.	0.	0.06	0.06
ACE	K29	ELLEN CHURCH FIELD	CRESO	IA	5314.	2000.	0.	0.06	0.05
ACE	C27	GRINNELL	GRINNELL	IA	6015.	1963.	0.	0.06	0.05
ACE	0Y7	MANCHESTER MUNI	MANCHESTER	IA	1843.	602.	0.	0.02	0.02
ACE		LAMONI MUNICIPAL	LAMONI	IA					
ACE	IXD	JOHNSON COUNTY INDUSTRIAL	OLATHE	KS	1517568.	288438.	995.	6.35*	12.00*
ACE	3LA	LAWRENCE MUNI	LAWRENCE	KS	936718.	253983.	831.	5.98*	7.98*
ACE	LBK	LIBERAL MUNI	LIBERAL	KS	634796.	221771.	523.	5.61	5.69
ACE	MHK	MANHATTAN MUNI	MANHATTAN	KS	581753.	210398.	439.	4.39	5.26
ACE	GCK	GARDEN CITY MUNI	GARDEN CITY	KS	532720.	200987.	362.	3.06	4.87
ACE	3KM	COMOTARA AIRPARK	WICHITA	KS	451762.	183679.	450.	3.30*	4.22*
ACE	3AU	AUGUSTA MUNI	WICHITA	KS	519681.	109632.	519.	3.55*	4.18*
ACE	EWK	NEWTON-CITY-COUNTY	AUGUSTA	KS	523942.	102422.	446.	4.05	4.16
ACE	HYS	HAYS MUNI	NEWTON	KS	331908.	164231.	280.	2.83	3.30
ACE	WLD	STROTHER FIELD	HAYS	KS	357800.	114482.	342.	3.38	3.14
ACE	EMP	EMPORIA MUNI	WINFIELD/ARKANSAS CITY	KS	401798.	68857.	330.	2.32*	3.13*
ACE	FSK	FORT SCOTT MUNI	EMPORIA	KS	292003.	66607.	284.	2.38	2.38
ACE	PTS	ATKINSON MUNI	FORT SCOTT	KS	242665.	68405.	234.	1.94	2.07
ACE	CFV	COFFEYVILLE MUNI	PIITSBURG	KS	1743359.	108004.	161.	1.74	1.83
ACE	CNU	CHANUTE MARTIN JOHNSON	CHANUTE	KS	179758.	96503.	181.	1.40*	1.84*
ACE	CEA	CESSNA ACFT FIELD	WICHITA	KS	152274.	104463.	223.	1.50*	1.78*
ACE	IDP	INDEPENDENCE MUNI	I'DEPENDENCE	KS	102765.	138884.	148.	1.39	1.71
ACE	GDD	GREAT BEND MUNI	GREAT BEND	KS	189702.	39820.	135.	1.19*	1.53*
ACE	BEC	BEECH FACTORY	WICHITA	KS	160672.	32986.	151.	1.02*	1.29*
ACE	RSL	RUSSELL MUNI	RUSSELL	KS	160025.	29049.	150.	1.39	1.26
ACE	LYO	LYONS-RICE COUNTY MUNI	LYONS	KS	101776.	58905.	98.	0.76*	1.02*
ACE	PHG	PHILLIPSBURG MUNI	PHILLIPSBURG	KS	107233.	45368.	81.	1.47	1.02
ACE	K95	ULYSSES	ULYSSES	KS	30285.	115227.	1.	1.47	0.97
ACE	PPF	TRI CITY	PARSONS	KS	109480.	24071.	108.	0.71*	0.89*
ACE	2K4	LARNED-PAWNEE COUNTY	LARNED	KS	100045.	32651.	0.	1.03	0.88
ACE	3KC	STATE LINE AIRPARK	LEAWOOD	KS	181832.	37528.	0.	0.85	0.79
ACE	K32	RIVERSIDE	WICHITA	KS	4642.	70801.	0.	0.65	0.77
ACE	3JC	JUNCTION CITY MUNI	JUNCTION CITY	KS	80099.	35741.	270.	1.30	0.77
ACE	2K3	STANTON COUNTY MUNI	JOHNSON	KS	89687.	18617.	85.	0.55*	0.72*
ACE	K31	COPELAND	WICHITA	KS					

ACE	RPB	BELLEVILLE MUNI	KS	57549.	36487.	53.	0.43*	0.62*
ACE	1K4	EL DORADO MUN	KS	72046.	17198.	307.	1.49	0.59
ACE	PTT	PRATT MUNI	KS	72734.	14308.	61.	0.77	0.58
ACE	H77	WELLINGTON MUNI	KS	64682.	21255.	235.	1.76	0.57
ACE	8K4	MEADE MUNI	KS	64322.	16758.	58.	0.39*	0.54*
ACE	K88	ALLEN COUNTY	KS	32451.	46070.	0.	0.46	0.52
ACE	K78	ABILENE MUNI	KS	40050.	34100.	0.	0.46	0.49
ACE	2K9	SCOTT CITY MUNI	KS	31393.	36573.	0.	0.40	0.45
ACE	K50	COOK AIRFIELD INC	KS	47662.	15561.	0.	0.49	0.42
ACE	1K2	CLAY CENTER MUNI	KS	20772.	42242.	0.	0.34	0.42
ACE	CBK	SHALTZ FIELD	KS	29615.	32158.	0.	1.24	0.41
ACE	K74	OAKLEY MUNI	KS	30821.	31088.	0.	0.37	0.41
ACE	K61	BELOIT MUNI	KS	30617.	29468.	105.	0.75	0.40
ACE	1K1	BENTON	KS	43324.	11670.	120.	0.79	0.37
ACE	MPR	MCPHERSON	KS	39153.	12778.	0.	1.62	0.35
ACE	K75	OSBORNE MUNI	KS	10514.	42794.	0.	0.24	0.35
ACE	7K1	HERINGTON MUNI	KS	23476.	27053.	80.	0.65	0.34
ACE	ANY	ANTHONY MUNI	KS	37911.	12237.	130.	0.88	0.33
ACE	HLC	HILL CITY MUNI	KS	32191.	15806.	0.	0.35	0.32
ACE	1K8	HUGOTON MUNI	KS	35978.	11743.	0.	0.37	0.32
ACE	KS04	PLAINVILLE ARPK	KS	12753.	29473.	0.	0.21	0.28
ACE	K68	GARNETT MUNI	KS	19910.	17317.	0.	0.24	0.25
ACE	30T	OTTAWA MUNI	KS	27147.	9941.	0.	0.28	0.25
ACE	9K8	KINGMAN MUNI	KS	23381.	12930.	0.	0.28	0.25
ACE	K60	ATWOOD-RAWLINS COUNTY CITY-COUNTY	KS	18392.	16505.	0.	0.22	0.23
ACE	K34	GARDNER MUNI	KS	24543.	8011.	0.	0.21	0.22
ACE	K81	OSAWATOMIE-PAOLA MUNI	KS	19015.	11193.	0.	0.21	0.20
ACE	K59	AMELIA EARHART	KS	22234.	7257.	0.	0.23	0.20
ACE	13K	EUREKA MUNI	KS	19078.	7580.	0.	0.20	0.18
ACE	K80	OSERLIN MUNI	KS	14057.	13029.	0.	0.17	0.18
ACE	K73	NORTON	KS	14226.	9943.	0.	0.16	0.16
ACE	5K2	TRIBUNE MUNI	KS	18070.	5898.	0.	0.19	0.16
ACE	1K5	ELKHART-MORTON COUNTY	KS	14967.	6135.	0.	0.16	0.14
ACE	2K7	ST FRANCIS MUNI	KS	7236.	12863.	0.	0.11	0.13
ACE	2K5	NEODESHA MUNI	KS	16618.	3091.	15.	0.14	0.13
ACE	69K	MARYSVILLE MUNI	KS	13982.	4564.	0.	0.14	0.12
ACE	3TA	WAMEGO MUNI	KS	12272.	4005.	0.	0.12	0.11
ACE	8K8	STAFFORD MUNI	KS	7255.	7667.	0.	0.09	0.10
ACE	3K3	CIMARRON MUNICIPAL	KS	11826.	3860.	0.	0.12	0.10
ACE	70K	SYRACUSE-HAMILTON COUNTY MUNI	KS	8269.	2087.	0.	0.08	0.07
ACE	56K	MAIZE	KS	6393.	2087.	0.	0.06	0.06
ACE	K64	PLAINS MUNI	KS	6594.	2152.	0.	0.07	0.06
ACE	1K3	VINLAND VALLEY AERODROME	KS	7158.	2336.	0.	0.07	0.06
ACE	K82	HAMILTON FIELD	KS	7256.	2368.	0.	0.07	0.06
ACE	K71	SMITH CENTER MUNI	KS	6026.	1967.	0.	0.06	0.05
ACE		LINCOLN MUNI	KS	6184.	2019.	0.	0.06	0.05
ACE	3WE	WEISS	MO	1827253.	76423.	1287.	8.56*	14.64*
ACE	K84	MC COMAS-LEE'S SUMMIT MUNI	MO	1758036.	302987.	1151.	7.76*	13.69*
ACE	3GV	EAST KANSAS CITY	MO	1052323.	289708.	1022.	8.70	8.92
ACE	35Z	ST. CHARLES COUNTY	MO	977499.	182687.	745.	4.92*	7.71*
ACE	JEF	JEFFERSON CITY MEML	MO	881824.	255538.	832.	6.00*	7.56*
ACE	VIH	ROLLA NATIONAL	MO	682205.	217619.	716.	4.38	5.98*
ACE	K07	ROLLA DOWNTOWN	MO	676763.	219819.	682.	5.27*	5.96*
ACE	HIG	HIGGINSVILLE INDUSTRIAL MUNI	MO	494009.	118060.	446.	6.41	4.07
ACE	MAW	MALDEN MUNI	MO	428299.	170532.	426.	3.10	3.98
ACE	K48	CHILLICOTHE MUNICIPAL	MO	345538.	144299.	289.	2.77	3.25
ACE	POF	EARL FIELDS MEMORIAL	MO	308044.	160950.	177.	1.92	3.12
ACE	A1Z	LEE C FINE MEMORIAL	MO	243239.	147271.	179.	2.02	2.59
ACE	M43	DEXTER MUNI	MO	315393.	66703.	301.	2.77	2.54

ACE	359	ST CHARLES	ST CHARLES	MO	278257	75229	266	1.91	2.35
ACE	K24	E W COTTON WOODS MEMORIAL	ST CHARLES	MO	271739	78127	270	1.82*	2.32*
ACE	L80	FLOYD W. JONES LEBANON	COLUMBIA	MO	247137	54988	239	1.96	2.01
ACE	B62	COUNTY MEMORIAL	LEBANON	MO	209169	61235	210	1.52*	1.80*
ACE	BUM	BUTLER MEMORIAL	NEW MADRID	MO	208872	35943	218	1.41*	1.63*
ACE	FAM	FARMINGTON REGIONAL	BUTLER	MO	123614	119145	100	1.94	1.61
ACE	MBY	OMAR N BRADLEY	FARMINGTON	MO	144905	76912	138	1.23	1.47
ACE	H63	WEST PLAINS MUNI	MOBERLY	MO	89785	127280	0	1.23	1.44
ACE	K22	AIR PARK SOUTH	WEST PLAINS	MO	128485	51248	104	0.91	1.19
ACE	H22	FESTUS MEML	OZARK	MO	74991	97917	134	2.37	1.15
ACE	3DW	DOWNTOWN	FESTUS	MO	68034	98396	0	0.97	1.11
ACE	02K	ARROWHEAD	SPRINGFIELD	MO	93103	67518	0	1.10	1.07
ACE	IRK	CLARENCE CANNON MEMORIAL	ST LOUIS	MO	130021	118782	0	1.71	1.06
ACE	K02	PERRYVILLE MUN	KIRKSVILLE	MO	68599	83507	129	0.87*	1.05*
ACE	S1K	SIKESTON MEML MUNI	PERRYVILLE	MO	85611	58908	0	2.64	1.01
ACE	82K	CAMERON MUNI	SIKESTON	MO	104191	34008	0	1.00	0.97
ACE	31P	INDEPENDENCE MEMORIAL	INDEPENDENCE	MO	63325	111586	1	1.29	0.87
ACE	DMO	SEDALIA MEMORIAL	SEDALIA	MO	82911	37935	75	0.59*	0.80*
ACE	M050	WENTZVILLE	WENTZVILLE	MO	78271	39635	73	0.65	0.78
ACE	H41	MEXICO MEMORIAL	MEXICO	MO	90148	18762	69	1.36	0.72
ACE	PLK	M GRAHAM CLARK	POINT LOOKOUT /BRANSON	MO	73017	24598	61	0.71	0.65
ACE	TRX	TRENTON MUNICIPAL	TRENTON	MO	58894	36073	1	1.78	0.63
ACE	84K	CLINTON MEMORIAL	CLINTON	MO	73874	20243	58	1.10	0.61
ACE	VER	JESSE VIERTEL MEMORIAL	BOONVILLE	MO	50108	41305	0	0.61	0.57
ACE	NVD	NEVADA MUNI	OSAGE BEACH	MO	11271	74380	0	0.36	0.57
ACE	K15	LINN CREEK-GRAND GLAIZE MEML	MOUNTAIN VIEW	MO	55150	30516	1	2.27	0.57
ACE	MNF	MOUNTAIN VIEW	NEOSHO	MO	35523	47193	0	0.49	0.55
ACE	E05	NEOSHO MEML	MARSHALL	MO	55762	23236	0	0.59	0.52
ACE	MHL	MARSHALL MEML MUNI	ST LOUIS	MO	57613	20434	194	1.28	0.52
ACE	1H0	CPEVE COEUR	WARRENSBURG	MO	15637	61336	0	0.34	0.51
ACE	9K4	SKYHAVEN	AURORA	MO	27957	42864	0	0.40	0.47
ACE	2H2	AURORA MEMORIAL MUNI	WASHINGTON	MO	22957	48099	0	0.38	0.47
ACE	M049	WASHINGTON MEMORIAL	EXCELSIOR SPRINGS	MO	51844	16926	0	0.51	0.46
ACE	3EX	EXCELSIOR SPRINGS MEMORIAL	BEIHANY	MO	54921	9452	52	0.35*	0.43*
ACE	75K	BETHANY MEMORIAL	CASSVILLE	MO	39525	25938	134	0.94	0.43
ACE	94K	CASSVILLE MUNICIPAL	BOWLING GREEN	MO	16971	43609	0	0.30	0.40
ACE	H19	BOWLING GREEN MUNICIPAL	VERSAILLES	MO	28095	29613	0	1.18	0.38
ACE	3VS	RJY OTTEN MEMORIAL AIRFIELD	HANNIBAL	MO	24082	28266	0	0.32	0.35
ACE	HAE	HANNIBAL MUNI	MARYVILLE	MO	24553	24329	0	0.30	0.32
ACE	K56	MARYVILLE MEML	CAMDETON	MO	35436	11566	0	0.37	0.31
ACE	H21	CAMDENTON MEMORIAL	CARTHAGE	MO	18717	28602	0	0.27	0.31
ACE	H20	MYERS PARK MEMORIAL MUNICIPAL	CARUTHERSVILLE	MO	31256	13168	99	0.66	0.30
ACE	M05	CARUTHERSVILLE MEMORIAL	CABOOL	MO	16726	28300	0	0.25	0.30
ACE	H74	CABOOL MEMORIAL	LEXINGTON	MO	24249	18415	0	0.29	0.28
ACE	4K3	LEXINGTON MUNI	CHARLESTON	MO	28508	9306	0	0.29	0.25
ACE	35M	MISSISSIPPI COUNTY	LIBERTY	MO	20737	16883	0	0.25	0.25
ACE	M010	ROOSTERVILLE	KENNETT	MO	23484	10393	0	0.24	0.23
ACE	M14	KENNETT MEMORIAL	CUBA	MO	23903	7801	0	0.23	0.21
ACE	UBX	CUBA MUNI	STOCKTON	MO	22882	7469	0	0.24	0.20
ACE	M043	STOCKTON MUNI	LAKE WINNEBAGO	MO	14180	15875	0	0.18	0.20
ACE	M008	LAKE WINNEBAGO MUNI	MEMPHIS	MO	22318	8408	0	0.22	0.20
ACE	M016	MEMPHIS MEMORIAL	STEELE	MO	14883	14089	48	0.36	0.19
ACE	M12	STEELE MUNI	FULTON	MO	19884	9308	0	0.22	0.19
ACE	H65	FULTON MUNI	ST CLAIR	MO	23779	6223	23	0.15*	0.19*
ACE	K39	ST CLAIR MEMORIAL	MONROE CITY	MO	19866	6485	0	0.20	0.18
ACE	K52	MONROE CITY REGIONAL	CAMPBELL	MO	18896	8698	0	0.20	0.18
ACE	34M	CAMPBELL MUNI	HARRISONVILLE	MO	13819	9629	0	0.16	0.16
ACE	M085	HARRISONVILLE	LIBERTY	MO	17283	5641	0	0.17	0.15
ACE	4M04	MISSOURI CITY	WILLOW SPRINGS	MO					
ACE	1H5	WILLOW SPRINGS MEMORIAL		MO					

ACE	73K	BILL MARTIN MEMORIAL	AVA	15743.	5138.	0.	0.15	0.14
ACE	H64	LAMAR MUNI	LAMAR	13454.	4391.	0.	0.13	0.12
ACE	H62	SULLIVAN MEMORIAL	SULLIVAN	12566.	4101.	0.	0.13	0.11
ACE	K04	HAER FIELD	TAYLOR	11336.	3700.	0.	0.12	0.10
ACE	K57	GOULD PETERSON MUNICIPAL	TARKIO	11839.	3864.	0.	0.12	0.10
ACE	M014	MANSFIELD MUNI	MANSFIELD	8856.	5708.	0.	0.10	0.10
ACE	M84	BOONVILLE MUNI	BOONVILLE	10735.	3504.	0.	0.11	0.09
ACE	K89	MACON-POWER MEML	MACON	7778.	2539.	0.	0.08	0.07
ACE	78Y	RANKIN	MARYVILLE	6169.	4194.	0.	0.07	0.07
ACE	H79	ELDON MODEL AIRPARK	ELDON	8239.	2689.	0.	0.08	0.07
ACE	M48	HOUSTON MEMORIAL	HOUSTON	7368.	2405.	0.	0.08	0.06
ACE	K33	SALEM MEMORIAL	SALEM	6629.	2164.	0.	0.06	0.06
ACE	K26	CARROLLTON MEMORIAL	CARROLLTON	5778.	1886.	0.	0.06	0.05
ACE	K45	ALBANY MEMORIAL	ALBANY	3987.	1301.	0.	0.04	0.04
ACE	M003	MODERS	HOUSE SPRINGS	3158.	1031.	0.	0.03	0.03
ACE	M013	TWIN CITY AIRPARK	LUTESVILLE	3600.	1175.	0.	0.04	0.03
ACE	89K	FARRIS STRIP	FAUCETT	1017.	332.	0.	0.01	0.01
ACE	EAR	KEARNEY MUNI	KEARNEY	569950.	202691.	515.	4.10	5.13
ACE	OLU	COLUMBUS MUNI	COLUMBUS	411588.	175893.	382.	3.15	3.90
ACE	HSI	HASTINGS MUNI	HASTINGS	346635.	164374.	302.	2.63	3.40
ACE	MCK	MCCOOK MUNI	MCCOOK	290425.	156788.	262.	2.76	2.97
ACE	MLE	MILLARD	OMAHA	274805.	164484.	0.	5.78	2.92
ACE	SNY	SIDNEY MUNI	SIDNEY	201984.	141458.	174.	2.00	2.28
ACE	AIA	ALLIANCE MUNI	ALLIANCE	190141.	139272.	137.	1.74	2.19
ACE	FET	FREMONT MUNI	FREMONT	197005.	131372.	185.	1.73	2.18
ACE	CDR	CHADRON MUNI	CHADRON	194104.	117525.	134.	2.00	2.07
ACE	BIE	BEATRICE MUNI	BEATRICE	176602.	96760.	160.	1.36	1.82
ACE	HDE	COZAD MUNI	COZAD	144342.	45548.	139.	0.96*	1.26*
ACE	CZE	BREWSTER FIELD	HOLDREGE	97393.	45759.	92.	0.81	0.95
ACE	LCG	WAYNE MUNI	WAYNE	80045.	59049.	74.	0.63*	0.92*
ACE	OGA	SEARLE FIELD	OGALLALA	91388.	29604.	58.	1.53	0.80
ACE	BBW	BROKEN BOW MUNI	BROKEN BOW	34402.	81248.	24.	0.53	0.77
ACE	3NO	NORTH OMAHA	OMAHA	71371.	43112.	0.	0.79	0.76
ACE	LXM	LEXINGTON MUNI	LEXINGTON	34449.	75698.	0.	1.46	0.73
ACE	ANW	AINSWORTH MUNI	AINSWORTH	15151.	83065.	0.	0.66	0.65
ACE	7K8	MARTIN FIELD	SO SIOUX CITY	52816.	41947.	0.	0.62	0.63
ACE	PMV	PLATTSMOUTH MUNI	PLATTSMOUTH	73630.	19262.	232.	1.49	0.62
ACE	ONL	O NEILL MUNI	O NEILL	67470.	24344.	64.	0.53	0.61
ACE	09K	SARGENT MUNI	SARGENT	3670.	76475.	0.	0.30	0.53
ACE	K46	FLIGHTLAND	OMAHA	48839.	21358.	0.	0.51	0.47
ACE	AUH	AURORA MUNI	AURORA	37512.	26549.	98.	0.90	0.43
ACE	GTE	GOTHENBURG MUNI	GOTHENBURG	34831.	19898.	112.	0.75	0.36
ACE	08K	HARVARD STATE	HARVARD	34770.	17554.	0.	0.38	0.35
ACE	K17	YORK MUNI	YORK	20699.	31144.	0.	0.29	0.34
ACE	4V7	KIMBALL MUNI	KIMBALL	11929.	30222.	0.	0.21	0.24
ACE	30A	SOUTH OMAHA	OMAHA /PAPILLION/	23375.	12582.	0.	0.25	0.22
ACE	9V5	MODISSETT	RUSHVILLE	5866.	26613.	0.	0.14	0.21
ACE	4V9	ANTELOPE COUNTY FIELD	NELIGH	19429.	11641.	0.	0.21	0.20
ACE	QDX	EVELYN SHARP FIELD	ORD	14239.	15483.	0.	0.18	0.20
ACE	0V3	PIONEER VILLAGE FIELD	MINDEN	11425.	18650.	0.	0.17	0.20
ACE	12K	SUPERIOR MUNI	SUPERIOR	15752.	14530.	25.	0.26	0.20
ACE	OKS	OSHKOSH MUNI	OSHKOSH	23270.	5742.	0.	0.14	0.19
ACE	IML	IMPERIAL MUNI	IMPERIAL	14977.	14095.	37.	0.29	0.19
ACE	NE22	TEKAMAH	TEKAMAH	20251.	6612.	0.	0.21	0.18
ACE	07K	CENTRAL CITY MUNI	CENTRAL CITY	12053.	14435.	0.	0.15	0.18
ACE	84Y	BLOOMFIELD MUNI	BLOOMFIELD	17460.	8414.	0.	0.18	0.17
ACE	93Y	DAVID CITY MUNI	DAVID CITY	9705.	16243.	0.	0.14	0.17
ACE	FNB	BRENNER FIELD	FALLS CITY	18421.	6013.	0.	0.19	0.16
ACE	FBY	FAIRBURY MUNI	FAIRBURY	14731.	9443.	32.	0.25	0.16

ACE	BUB	CRAM FIELD	NE	10119.	11814.	9.	0.09*	0.15*
ACE	SCB	SCRIBNER STATE	NE	13659.	9411.	0.	0.16	0.15
ACE	7NE7	SEWARD MUNI	NE	11135.	11562.	0.	0.14	0.15
ACE	AHQ	WAHOO MUNI	NE	15895.	6082.	10.	0.12*	0.15*
ACE	K13	FAIRMONT STATE AIRFIELD	NE	12204.	10231.	0.	0.15	0.15
ACE	15K	ALBION MUNI	NE	12863.	9470.	0.	0.14	0.15
ACE	CSB	CAMBRIDGE MUNI	NE	11875.	8963.	0.	0.14	0.14
ACE	3GN	GRUNDMAN	NE	14812.	4836.	0.	0.15	0.13
ACE	NE02	HARTINGTON MUNI	NE	6033.	13016.	0.	0.10	0.13
ACE	6K3	CREIGHTON MUNI	NE	5363.	14120.	0.	0.10	0.13
ACE	5V3	THOMAS COUNTY	NE	8304.	9749.	5.	0.08*	0.12*
ACE	K03	CRETE MUNI	NE	8363.	10146.	0.	0.31	0.12
ACE	47V	CURTIS MUNI	NE	8279.	7654.	0.	0.10	0.11
ACE	GRN	GORDON MUNI	NE	7820.	7504.	0.	0.10	0.10
ACE	0V0	GRANT MUNI	NE	9960.	3252.	0.	0.10	0.09
ACE	K09	HEBRON MUNI	NE	7403.	4875.	0.	0.08	0.08
ACE	7V7	RED CLOUD MUNI	NE	7402.	2416.	0.	0.07	0.07
ACE	K01	AUBURN MUNI	NE	013.	4175.	0.	0.06	0.06
ACE	NE21	TECUMSEH MUNICIPAL	NE	6973.	2276.	0.	0.07	0.06
ACE	NE23	FLYING V	NE	5701.	1861.	0.	0.06	0.05
ACE	8V2	STUART-ATKINSON MUNI	NE	4633.	2072.	0.	0.05	0.04

EASTERN REGION

AEA	33N	DELAWARE AIRPARK	DE	639262.	211667.	652.	3.29	5.65
AEA <td>GED <td>SUSSEX COUNTY <td>DE <td>331583.</td> <td>163185.</td> <td>321.</td> <td>2.35</td> <td>3.29</td> </td></td></td>	GED <td>SUSSEX COUNTY <td>DE <td>331583.</td> <td>163185.</td> <td>321.</td> <td>2.35</td> <td>3.29</td> </td></td>	SUSSEX COUNTY <td>DE <td>331583.</td> <td>163185.</td> <td>321.</td> <td>2.35</td> <td>3.29</td> </td>	DE <td>331583.</td> <td>163185.</td> <td>321.</td> <td>2.35</td> <td>3.29</td>	331583.	163185.	321.	2.35	3.29
AEA <td>REH <td>REHOBOTH AIRCRAFTERS <td>DE <td>257095.</td> <td>139130.</td> <td>241.</td> <td>1.91*</td> <td>2.63*</td> </td></td></td>	REH <td>REHOBOTH AIRCRAFTERS <td>DE <td>257095.</td> <td>139130.</td> <td>241.</td> <td>1.91*</td> <td>2.63*</td> </td></td>	REHOBOTH AIRCRAFTERS <td>DE <td>257095.</td> <td>139130.</td> <td>241.</td> <td>1.91*</td> <td>2.63*</td> </td>	DE <td>257095.</td> <td>139130.</td> <td>241.</td> <td>1.91*</td> <td>2.63*</td>	257095.	139130.	241.	1.91*	2.63*
AEA <td>N92 <td>SUMMIT AIRPARK <td>DE <td>96944.</td> <td>65996.</td> <td>0.</td> <td>2.96</td> <td>1.08</td> </td></td></td>	N92 <td>SUMMIT AIRPARK <td>DE <td>96944.</td> <td>65996.</td> <td>0.</td> <td>2.96</td> <td>1.08</td> </td></td>	SUMMIT AIRPARK <td>DE <td>96944.</td> <td>65996.</td> <td>0.</td> <td>2.96</td> <td>1.08</td> </td>	DE <td>96944.</td> <td>65996.</td> <td>0.</td> <td>2.96</td> <td>1.08</td>	96944.	65996.	0.	2.96	1.08
AEA <td>0N4 <td>CHANDELLE ESTATES <td>DE <td>75202.</td> <td>73660.</td> <td>0.</td> <td>0.94</td> <td>0.99</td> </td></td></td>	0N4 <td>CHANDELLE ESTATES <td>DE <td>75202.</td> <td>73660.</td> <td>0.</td> <td>0.94</td> <td>0.99</td> </td></td>	CHANDELLE ESTATES <td>DE <td>75202.</td> <td>73660.</td> <td>0.</td> <td>0.94</td> <td>0.99</td> </td>	DE <td>75202.</td> <td>73660.</td> <td>0.</td> <td>0.94</td> <td>0.99</td>	75202.	73660.	0.	0.94	0.99
AEA <td>N98 <td>MILFORD AIRPARK <td>DE <td>11217.</td> <td>20145.</td> <td>0.</td> <td>0.17</td> <td>0.21</td> </td></td></td>	N98 <td>MILFORD AIRPARK <td>DE <td>11217.</td> <td>20145.</td> <td>0.</td> <td>0.17</td> <td>0.21</td> </td></td>	MILFORD AIRPARK <td>DE <td>11217.</td> <td>20145.</td> <td>0.</td> <td>0.17</td> <td>0.21</td> </td>	DE <td>11217.</td> <td>20145.</td> <td>0.</td> <td>0.17</td> <td>0.21</td>	11217.	20145.	0.	0.17	0.21
AEA <td>15N <td>JENKINS <td>DE <td>12992.</td> <td>9734.</td> <td>0.</td> <td>0.15</td> <td>0.15</td> </td></td></td>	15N <td>JENKINS <td>DE <td>12992.</td> <td>9734.</td> <td>0.</td> <td>0.15</td> <td>0.15</td> </td></td>	JENKINS <td>DE <td>12992.</td> <td>9734.</td> <td>0.</td> <td>0.15</td> <td>0.15</td> </td>	DE <td>12992.</td> <td>9734.</td> <td>0.</td> <td>0.15</td> <td>0.15</td>	12992.	9734.	0.	0.15	0.15
AEA <td>38N <td>SMYRNA <td>DE <td>11626.</td> <td>6551.</td> <td>0.</td> <td>0.12</td> <td>0.12</td> </td></td></td>	38N <td>SMYRNA <td>DE <td>11626.</td> <td>6551.</td> <td>0.</td> <td>0.12</td> <td>0.12</td> </td></td>	SMYRNA <td>DE <td>11626.</td> <td>6551.</td> <td>0.</td> <td>0.12</td> <td>0.12</td> </td>	DE <td>11626.</td> <td>6551.</td> <td>0.</td> <td>0.12</td> <td>0.12</td>	11626.	6551.	0.	0.12	0.12
AEA <td>N06 <td>LAUREL <td>DE <td>8739.</td> <td>2853.</td> <td>0.</td> <td>0.09</td> <td>0.08</td> </td></td></td>	N06 <td>LAUREL <td>DE <td>8739.</td> <td>2853.</td> <td>0.</td> <td>0.09</td> <td>0.08</td> </td></td>	LAUREL <td>DE <td>8739.</td> <td>2853.</td> <td>0.</td> <td>0.09</td> <td>0.08</td> </td>	DE <td>8739.</td> <td>2853.</td> <td>0.</td> <td>0.09</td> <td>0.08</td>	8739.	2853.	0.	0.09	0.08
AEA <td>SBY <td>SALISBURY-WICOMICO COUNTY <td>MD <td>1424433.</td> <td>338446.</td> <td>0.</td> <td>2.29</td> <td>11.71</td> </td></td></td>	SBY <td>SALISBURY-WICOMICO COUNTY <td>MD <td>1424433.</td> <td>338446.</td> <td>0.</td> <td>2.29</td> <td>11.71</td> </td></td>	SALISBURY-WICOMICO COUNTY <td>MD <td>1424433.</td> <td>338446.</td> <td>0.</td> <td>2.29</td> <td>11.71</td> </td>	MD <td>1424433.</td> <td>338446.</td> <td>0.</td> <td>2.29</td> <td>11.71</td>	1424433.	338446.	0.	2.29	11.71
AEA <td>GAI <td>MONTGOMERY COUNTY ARPK <td>MD <td>1300322.</td> <td>331389.</td> <td>1263.</td> <td>8.71</td> <td>10.84</td> </td></td></td>	GAI <td>MONTGOMERY COUNTY ARPK <td>MD <td>1300322.</td> <td>331389.</td> <td>1263.</td> <td>8.71</td> <td>10.84</td> </td></td>	MONTGOMERY COUNTY ARPK <td>MD <td>1300322.</td> <td>331389.</td> <td>1263.</td> <td>8.71</td> <td>10.84</td> </td>	MD <td>1300322.</td> <td>331389.</td> <td>1263.</td> <td>8.71</td> <td>10.84</td>	1300322.	331389.	1263.	8.71	10.84
AEA <td>MTN <td>GLENN L. MARTIN STATE <td>MD <td>809587.</td> <td>159066.</td> <td>740.</td> <td>4.27*</td> <td>6.44*</td> </td></td></td>	MTN <td>GLENN L. MARTIN STATE <td>MD <td>809587.</td> <td>159066.</td> <td>740.</td> <td>4.27*</td> <td>6.44*</td> </td></td>	GLENN L. MARTIN STATE <td>MD <td>809587.</td> <td>159066.</td> <td>740.</td> <td>4.27*</td> <td>6.44*</td> </td>	MD <td>809587.</td> <td>159066.</td> <td>740.</td> <td>4.27*</td> <td>6.44*</td>	809587.	159066.	740.	4.27*	6.44*
AEA <td>W18 <td>SUBURBAN <td>MD <td>700564.</td> <td>130159.</td> <td>644.</td> <td>4.16*</td> <td>5.52*</td> </td></td></td>	W18 <td>SUBURBAN <td>MD <td>700564.</td> <td>130159.</td> <td>644.</td> <td>4.16*</td> <td>5.52*</td> </td></td>	SUBURBAN <td>MD <td>700564.</td> <td>130159.</td> <td>644.</td> <td>4.16*</td> <td>5.52*</td> </td>	MD <td>700564.</td> <td>130159.</td> <td>644.</td> <td>4.16*</td> <td>5.52*</td>	700564.	130159.	644.	4.16*	5.52*
AEA <td>FDK <td>FREDERICK MUNI <td>MD <td>596747.</td> <td>135097.</td> <td>498.</td> <td>5.81</td> <td>4.86</td> </td></td></td>	FDK <td>FREDERICK MUNI <td>MD <td>596747.</td> <td>135097.</td> <td>498.</td> <td>5.81</td> <td>4.86</td> </td></td>	FREDERICK MUNI <td>MD <td>596747.</td> <td>135097.</td> <td>498.</td> <td>5.81</td> <td>4.86</td> </td>	MD <td>596747.</td> <td>135097.</td> <td>498.</td> <td>5.81</td> <td>4.86</td>	596747.	135097.	498.	5.81	4.86
AEA <td>N80 <td>OCEAN CITY <td>MD <td>506517.</td> <td>193248.</td> <td>0.</td> <td>1.40</td> <td>4.65</td> </td></td></td>	N80 <td>OCEAN CITY <td>MD <td>506517.</td> <td>193248.</td> <td>0.</td> <td>1.40</td> <td>4.65</td> </td></td>	OCEAN CITY <td>MD <td>506517.</td> <td>193248.</td> <td>0.</td> <td>1.40</td> <td>4.65</td> </td>	MD <td>506517.</td> <td>193248.</td> <td>0.</td> <td>1.40</td> <td>4.65</td>	506517.	193248.	0.	1.40	4.65
AEA <td>ANP <td>LEE <td>MD <td>570122.</td> <td>115292.</td> <td>537.</td> <td>3.52*</td> <td>4.55*</td> </td></td></td>	ANP <td>LEE <td>MD <td>570122.</td> <td>115292.</td> <td>537.</td> <td>3.52*</td> <td>4.55*</td> </td></td>	LEE <td>MD <td>570122.</td> <td>115292.</td> <td>537.</td> <td>3.52*</td> <td>4.55*</td> </td>	MD <td>570122.</td> <td>115292.</td> <td>537.</td> <td>3.52*</td> <td>4.55*</td>	570122.	115292.	537.	3.52*	4.55*
AEA <td>CBE <td>CUMBERLAND MUNI <td>MD <td>396671.</td> <td>154278.</td> <td>367.</td> <td>2.86*</td> <td>3.66*</td> </td></td></td>	CBE <td>CUMBERLAND MUNI <td>MD <td>396671.</td> <td>154278.</td> <td>367.</td> <td>2.86*</td> <td>3.66*</td> </td></td>	CUMBERLAND MUNI <td>MD <td>396671.</td> <td>154278.</td> <td>367.</td> <td>2.86*</td> <td>3.66*</td> </td>	MD <td>396671.</td> <td>154278.</td> <td>367.</td> <td>2.86*</td> <td>3.66*</td>	396671.	154278.	367.	2.86*	3.66*
AEA <td>2G4 <td>GARRETT COUNTY <td>MD <td>241386.</td> <td>111434.</td> <td>250.</td> <td>1.03</td> <td>2.34</td> </td></td></td>	2G4 <td>GARRETT COUNTY <td>MD <td>241386.</td> <td>111434.</td> <td>250.</td> <td>1.03</td> <td>2.34</td> </td></td>	GARRETT COUNTY <td>MD <td>241386.</td> <td>111434.</td> <td>250.</td> <td>1.03</td> <td>2.34</td> </td>	MD <td>241386.</td> <td>111434.</td> <td>250.</td> <td>1.03</td> <td>2.34</td>	241386.	111434.	250.	1.03	2.34
AEA <td>2W6 <td>ST MARYS COUNTY <td>MD <td>261956.</td> <td>72876.</td> <td>0.</td> <td>0.61</td> <td>2.22</td> </td></td></td>	2W6 <td>ST MARYS COUNTY <td>MD <td>261956.</td> <td>72876.</td> <td>0.</td> <td>0.61</td> <td>2.22</td> </td></td>	ST MARYS COUNTY <td>MD <td>261956.</td> <td>72876.</td> <td>0.</td> <td>0.61</td> <td>2.22</td> </td>	MD <td>261956.</td> <td>72876.</td> <td>0.</td> <td>0.61</td> <td>2.22</td>	261956.	72876.	0.	0.61	2.22
AEA <td>W48 <td>ESSEX SKYPARK <td>MD <td>262627.</td> <td>53852.</td> <td>197.</td> <td>1.64*</td> <td>2.10*</td> </td></td></td>	W48 <td>ESSEX SKYPARK <td>MD <td>262627.</td> <td>53852.</td> <td>197.</td> <td>1.64*</td> <td>2.10*</td> </td></td>	ESSEX SKYPARK <td>MD <td>262627.</td> <td>53852.</td> <td>197.</td> <td>1.64*</td> <td>2.10*</td> </td>	MD <td>262627.</td> <td>53852.</td> <td>197.</td> <td>1.64*</td> <td>2.10*</td>	262627.	53852.	197.	1.64*	2.10*
AEA <td>W42 <td>FALLSTON <td>MD <td>232942.</td> <td>63323.</td> <td>209.</td> <td>0.59*</td> <td>1.97*</td> </td></td></td>	W42 <td>FALLSTON <td>MD <td>232942.</td> <td>63323.</td> <td>209.</td> <td>0.59*</td> <td>1.97*</td> </td></td>	FALLSTON <td>MD <td>232942.</td> <td>63323.</td> <td>209.</td> <td>0.59*</td> <td>1.97*</td> </td>	MD <td>232942.</td> <td>63323.</td> <td>209.</td> <td>0.59*</td> <td>1.97*</td>	232942.	63323.	209.	0.59*	1.97*
AEA <td>ESN <td>EASTON MUNI <td>MD <td>117464.</td> <td>143337.</td> <td>1.</td> <td>4.10</td> <td>1.73</td> </td></td></td>	ESN <td>EASTON MUNI <td>MD <td>117464.</td> <td>143337.</td> <td>1.</td> <td>4.10</td> <td>1.73</td> </td></td>	EASTON MUNI <td>MD <td>117464.</td> <td>143337.</td> <td>1.</td> <td>4.10</td> <td>1.73</td> </td>	MD <td>117464.</td> <td>143337.</td> <td>1.</td> <td>4.10</td> <td>1.73</td>	117464.	143337.	1.	4.10	1.73
AEA <td>W00 <td>FREEMAN <td>MD <td>116174.</td> <td>48401.</td> <td>0.</td> <td>1.19</td> <td>1.09</td> </td></td></td>	W00 <td>FREEMAN <td>MD <td>116174.</td> <td>48401.</td> <td>0.</td> <td>1.19</td> <td>1.09</td> </td></td>	FREEMAN <td>MD <td>116174.</td> <td>48401.</td> <td>0.</td> <td>1.19</td> <td>1.09</td> </td>	MD <td>116174.</td> <td>48401.</td> <td>0.</td> <td>1.19</td> <td>1.09</td>	116174.	48401.	0.	1.19	1.09
AEA <td>W29 <td>BAY BRIDGE INDUSTRIAL <td>MD <td>127148.</td> <td>35110.</td> <td>311.</td> <td>2.14</td> <td>1.08</td> </td></td></td>	W29 <td>BAY BRIDGE INDUSTRIAL <td>MD <td>127148.</td> <td>35110.</td> <td>311.</td> <td>2.14</td> <td>1.08</td> </td></td>	BAY BRIDGE INDUSTRIAL <td>MD <td>127148.</td> <td>35110.</td> <td>311.</td> <td>2.14</td> <td>1.08</td> </td>	MD <td>127148.</td> <td>35110.</td> <td>311.</td> <td>2.14</td> <td>1.08</td>	127148.	35110.	311.	2.14	1.08
AEA <td>W32 <td>HYDE FLD <td>MD <td>112917.</td> <td>42134.</td> <td>0.</td> <td>1.19</td> <td>1.03</td> </td></td></td>	W32 <td>HYDE FLD <td>MD <td>112917.</td> <td>42134.</td> <td>0.</td> <td>1.19</td> <td>1.03</td> </td></td>	HYDE FLD <td>MD <td>112917.</td> <td>42134.</td> <td>0.</td> <td>1.19</td> <td>1.03</td> </td>	MD <td>112917.</td> <td>42134.</td> <td>0.</td> <td>1.19</td> <td>1.03</td>	112917.	42134.	0.	1.19	1.03
AEA <td>W54 <td>WESTMINSTER <td>MD <td>102690.</td> <td>25187.</td> <td>81.</td> <td>0.86</td> <td>0.85</td> </td></td></td>	W54 <td>WESTMINSTER <td>MD <td>102690.</td> <td>25187.</td> <td>81.</td> <td>0.86</td> <td>0.85</td> </td></td>	WESTMINSTER <td>MD <td>102690.</td> <td>25187.</td> <td>81.</td> <td>0.86</td> <td>0.85</td> </td>	MD <td>102690.</td> <td>25187.</td> <td>81.</td> <td>0.86</td> <td>0.85</td>	102690.	25187.	81.	0.86	0.85
AEA <td>CGE <td>CAMBRIDGE MUNI <td>MD <td>38025.</td> <td>69090.</td> <td>0.</td> <td>0.51</td> <td>0.71</td> </td></td></td>	CGE <td>CAMBRIDGE MUNI <td>MD <td>38025.</td> <td>69090.</td> <td>0.</td> <td>0.51</td> <td>0.71</td> </td></td>	CAMBRIDGE MUNI <td>MD <td>38025.</td> <td>69090.</td> <td>0.</td> <td>0.51</td> <td>0.71</td> </td>	MD <td>38025.</td> <td>69090.</td> <td>0.</td> <td>0.51</td> <td>0.71</td>	38025.	69090.	0.	0.51	0.71
AEA <td>W28 <td>P G AIRPARK <td>MD <td>73629.</td> <td>31952.</td> <td>0.</td> <td>0.76</td> <td>0.70</td> </td></td></td>	W28 <td>P G AIRPARK <td>MD <td>73629.</td> <td>31952.</td> <td>0.</td> <td>0.76</td> <td>0.70</td> </td></td>	P G AIRPARK <td>MD <td>73629.</td> <td>31952.</td> <td>0.</td> <td>0.76</td> <td>0.70</td> </td>	MD <td>73629.</td> <td>31952.</td> <td>0.</td> <td>0.76</td> <td>0.70</td>	73629.	31952.	0.	0.76	0.70
AEA <td>1W2 <td>BALTIMORE AIRPARK <td>MD <td>69476.</td> <td>25345.</td> <td>0.</td> <td>0.70</td> <td>0.63</td> </td></td></td>	1W2 <td>BALTIMORE AIRPARK <td>MD <td>69476.</td> <td>25345.</td> <td>0.</td> <td>0.70</td> <td>0.63</td> </td></td>	BALTIMORE AIRPARK <td>MD <td>69476.</td> <td>25345.</td> <td>0.</td> <td>0.70</td> <td>0.63</td> </td>	MD <td>69476.</td> <td>25345.</td> <td>0.</td> <td>0.70</td> <td>0.63</td>	69476.	25345.	0.	0.70	0.63
AEA <td>0W3 <td>ALDINO <td>MD <td>30536.</td> <td>62571.</td> <td>0.</td> <td>0.48</td> <td>0.62</td> </td></td></td>	0W3 <td>ALDINO <td>MD <td>30536.</td> <td>62571.</td> <td>0.</td> <td>0.48</td> <td>0.62</td> </td></td>	ALDINO <td>MD <td>30536.</td> <td>62571.</td> <td>0.</td> <td>0.48</td> <td>0.62</td> </td>	MD <td>30536.</td> <td>62571.</td> <td>0.</td> <td>0.48</td> <td>0.62</td>	30536.	62571.	0.	0.48	0.62
AEA <td>W50 <td>DAVIS <td>MD <td>63302.</td> <td>20663.</td> <td>0.</td> <td>0.63</td> <td>0.56</td> </td></td></td>	W50 <td>DAVIS <td>MD <td>63302.</td> <td>20663.</td> <td>0.</td> <td>0.63</td> <td>0.56</td> </td></td>	DAVIS <td>MD <td>63302.</td> <td>20663.</td> <td>0.</td> <td>0.63</td> <td>0.56</td> </td>	MD <td>63302.</td> <td>20663.</td> <td>0.</td> <td>0.63</td> <td>0.56</td>	63302.	20663.	0.	0.63	0.56
AEA <td>2W5 <td>MARYLAND <td>MD <td>46496.</td> <td>30921.</td> <td>0.</td> <td>0.52</td> <td>0.51</td> </td></td></td>	2W5 <td>MARYLAND <td>MD <td>46496.</td> <td>30921.</td> <td>0.</td> <td>0.52</td> <td>0.51</td> </td></td>	MARYLAND <td>MD <td>46496.</td> <td>30921.</td> <td>0.</td> <td>0.52</td> <td>0.51</td> </td>	MD <td>46496.</td> <td>30921.</td> <td>0.</td> <td>0.52</td> <td>0.51</td>	46496.	30921.	0.	0.52	0.51
AEA <td>2W2 <td>CLEARVIEW AIRPARK <td>MD <td>56250.</td> <td>11261.</td> <td>44.</td> <td>0.34*</td> <td>0.45*</td> </td></td></td>	2W2 <td>CLEARVIEW AIRPARK <td>MD <td>56250.</td> <td>11261.</td> <td>44.</td> <td>0.34*</td> <td>0.45*</td> </td></td>	CLEARVIEW AIRPARK <td>MD <td>56250.</td> <td>11261.</td> <td>44.</td> <td>0.34*</td> <td>0.45*</td> </td>	MD <td>56250.</td> <td>11261.</td> <td>44.</td> <td>0.34*</td> <td>0.45*</td>	56250.	11261.	44.	0.34*	0.45*

AEA	CGS	COLLEGE PARK	COLLEGE PARK	MD	32813.	15990.	0.	0.34	0.32
AEA	2W8	AQUA-LAND/CLIFFTON SKYPARK	NEWBURG	MD	34888.	11386.	0.	0.34	0.31
AEA	2N0	CECIL COUNTY AIRPARK	ELKTON	MD	18545.	11333.	0.	0.20	0.20
AEA	W19	PARK HALL	PARK HALL	MD	18972.	5900.	0.	0.18	0.16
AEA	W41	CRISFIELD MUNI	CRISFIELD	MD	8924.	8205.	0.	0.11	0.11
AEA	0W2	DEEP CREEK AIRPARK	CHURCHTON	MD	5590.	1825.	0.	0.05	0.05
AEA	N87	TRENTON-ROBBINSVILLE	ROBBINSVILLE	NJ	4753774.	877609.	5133.	22.00	37.42
AEA	7MY	BURLINGTON COUNTY AIRPARK	MOUNT HOLLY	NJ	1475711.	364937.	1478.	9.90*	12.23*
AEA	WUD	CAPE MAY COUNTY	WILDWOOD	NJ	1137595.	291583.	1314.	5.83	9.50
AEA	BLM	MONMOUTH COUNTY	BELMAR-FARMINGDALE	NJ	1033627.	303423.	944.	8.42*	8.88*
AEA	16N	CAMDEN-BURLINGTON	BERLIN	NJ	994306.	178297.	972.	6.28*	7.79*
AEA	MIV	MILLVILLE MUNI	MILLVILLE	NJ	926928.	239208.	1026.	4.88	7.75
AEA	17N	CROSS KEYS	CROSS KEYS	NJ	511839.	163460.	494.	2.69	4.49
AEA	AIY	ATLANTIC CITY MUNI/GRADER FIELD	ATLANTIC CITY	NJ	468629.	181497.	491.	2.96	4.32
AEA	3N9	SMITHVILLE AIRFIELD	SMITHVILLE	NJ	442824.	86185.	421.	3.20*	3.51*
AEA	N44	ROBERT J. MILLER AIR PARK	TOMS RIVER	NJ	373037.	108738.	405.	2.70	3.20
AEA	N12	LAKESWOOD	LAKESWOOD	NJ	384777.	64911.	403.	2.10	2.99
AEA	N83	BRIDGEPORT	BRIDGEPORT	NJ	359062.	75688.	345.	1.74	2.89
AEA	LDJ	LINDEN	LINDEN	NJ	233877.	160944.	0.	2.40	2.62
AEA	N52	SOMERSET	SOMERVILLE	NJ	200979.	170972.	0.	2.63	2.47
AEA	N81	HAMMONTON MUNI	HAMMONTON	NJ	285041.	59084.	256.	1.83*	2.29*
AEA	19N	ALBION	ALBION	NJ	175614.	98384.	71.	1.55*	1.82*
AEA	N63	SUSSEX	SUSSEX	NJ	195226.	63736.	0.	2.07	1.72
AEA	39N	PRINCETON	PRINCETON/ROCKY HILL/	NJ	104330.	133553.	285.	1.28	1.58
AEA	1N7	BLAIRSTOWN	BLAIRSTOWN	NJ	145145.	56810.	0.	1.57	1.34
AEA	N50	LI CALZI	BRIDGETON	NJ	134043.	48980.	0.	1.37	1.22*
AEA	29N	KROELINGER	VINELAND	NJ	132781.	41251.	125.	0.90*	1.16*
AEA	26N	OCEAN CITY MUNI	OCEAN CITY	NJ	116897.	43448.	0.	1.25	1.07
AEA	N61	SKY MANOR	COLTS NECK	NJ	94043.	41145.	0.	0.99	0.90
AEA	N40	RED LION	PITTSSTOWN	NJ	112700.	23448.	126.	0.50	0.90
AEA	N73	ALEXANDRIA	VINCENSTOWN	NJ	93451.	26764.	62.	0.70*	0.80*
AEA	N85	FORRESTAL	PITTSSTOWN	NJ	83021.	34945.	0.	0.87	0.78
AEA	N21	KUPPER	PRINCETON	NJ	0.	105363.	0.	0.51	0.70
AEA	47N	SOMERSET HILLS	MANVILLE	NJ	46271.	55589.	0.	0.63	0.68
AEA	N64	SOLBERG-HUNTERDON	BASKING RIDGE	NJ	66973.	21862.	0.	0.71	0.59
AEA	N51	FLANDERS VALLEY	READINGTON	NJ	64725.	22359.	0.	0.69	0.58
AEA	81N	HANOVER	FLANDERS	NJ	64490.	23488.	0.	0.69	0.58
AEA	N58	MANAHAWKIN	HANOVER	NJ	61510.	20080.	0.	0.62	0.54
AEA	72N	MARLBORO	MANAHAWKIN	NJ	66363.	11609.	61.	0.40*	0.52*
AEA	2N8	SALEM AIRFIELD	MATAWAN	NJ	31798.	33934.	0.	0.69	0.44
AEA	27N	LINCOLN PARK	SALEM	NJ	39822.	12997.	0.	0.40	0.35
AEA	N07	AEROFLEX-ANDOVER	LINCOLN PARK	NJ	21833.	26024.	0.	0.30	0.32
AEA	12N	RUDYS	ANDOVER	NJ	23192.	18071.	0.	0.28	0.27
AEA	25N	HACKETTSTOWN	VINELAND	NJ	24624.	5260.	17.	0.16*	0.20*
AEA	N05	NORDHEIM FLYING K AIRPARK	HACKETTSTOWN	NJ	22954.	7493.	0.	0.24	0.20
AEA	1N6	PITMAN	BARGAINSTOWN	NJ	21404.	6987.	0.	0.22	0.19
AEA	24N	GREENWOOD LAKE	PITMAN	NJ	19783.	6458.	0.	0.20	0.17
AEA	4N1	TWIN PINE	WEST MILFORD	NJ	16637.	6680.	0.	0.18	0.16
AEA	N75	WOODBINE MUNI	PENNINGTON	NJ	18204.	5943.	0.	0.18	0.16
AEA	1N4	VINELAND-DOWNSTOWN	WOODBINE	NJ	10625.	12876.	0.	0.15	0.16
AEA	28N	BUCKS	VINELAND	NJ	14016.	4576.	0.	0.14	0.12
AEA	00N	STEWART	BRIDGETON	NJ	9102.	2971.	0.	0.09	0.08
AEA	SWF	SUFFOLK COUNTY	NEWBURGH	NY	1801567.	399426.	1942.	10.39*	14.62*
AEA	FOK	GENESEE COUNTY	WESTHAMPTON BEACH	NY	1658190.	289936.	1585.	8.74*	12.94*
AEA	3G8	ORANGE COUNTY	BATAVIA	NY	1503258.	310453.	1646.	7.53	12.05
AEA	MGJ	TRI-CITIES	MONTGOMERY	NY	1245029.	256857.	1332.	9.66	9.98
AEA	N17	DUNKIRK MUNI	ENDICOTT	NY	1148136.	299479.	1246.	9.50*	9.62*
AEA	DKK		DUNKIRK	NY	908703.	258701.	968.	5.10	7.76

SCHEMECTADY COUNTY	NY	914023.	155002.	877.	5.58*	7.10*
JAMESTOWN	NY	587206.	201677.	644.	3.14	5.24
BUFFALO AIRPARK	NY	612135.	124948.	658.	3.26	4.90
WATERTOWN NEW YORK INTL	NY	415483.	173092.	455.	3.91	3.91
WURTSBORO-SULLIVAN COUNTY	NY	474276.	100958.	456.	3.08*	3.82*
STORMVILLE	NY	460941.	90837.	449.	2.98*	3.67*
MONTICELLO	NY	397303.	143239.	473.	2.75	3.59
GLENS FALLS	NY	372851.	158732.	406.	2.98	3.53
SHIRLEY	NY	290289.	200118.	0.	9.88	3.26
SPRING VALLEY	NY	268422.	192776.	0.	3.28	3.06
MASSENA	NY	286411.	149942.	328.	1.62	2.90
NORWICH	NY	177279.	135444.	187.	1.66*	2.08*
DANVILLE	NY	142702.	150216.	0.	6.46	1.95
PLATTSBURGH	NY	156163.	131719.	169.	1.31	1.91
BUFFALO	NY	135869.	149703.	0.	1.91	1.90
CORTLAND	NY	154622.	120564.	129.	3.10	1.83
AKRON	NY	205029.	38557.	222.	0.99	1.62
MILLBROOK	NY	113290.	122882.	109.	1.16*	1.57*
NEW YORK/FLUSHING/	NY	177457.	57907.	0.	1.87	1.56
SARANAC LAKE	NY	108833.	123641.	117.	0.95	1.54
EAST HAMPTON	NY	94883.	136327.	0.	1.52	1.54
PENN YAN	NY	100193.	124520.	91.	1.41	1.49
FISHERS ISLAND	NY	104916.	107766.	106.	1.03*	1.41*
FULTON	NY	135253.	66544.	0.	5.19	1.34*
MIDDLETOWN	NY	170044.	31125.	165.	1.09*	1.34*
WELLSVILLE.	NY	71045.	118467.	68.	1.00	1.26
WALLKILL	NY	132004.	56546.	0.	1.47	1.25
SARATOGA SPRINGS	NY	86964.	95598.	0.	3.52	1.21
LOCKPORT	NY	33806.	116399.	0.	0.86	1.00
KINGSTON	NY	32651.	116021.	0.	0.85	0.99
HUDSON	NY	31272.	115549.	1.	1.83	0.98
ALBION	NY	122240.	24496.	117.	0.77*	0.97*
SIDNEY	NY	23796.	109782.	1.	1.12	0.89
PORT WASHINGTON	NY	13972.	109925.	0.	0.65	0.82
OGDENSBURG	NY	12503.	109444.	0.	0.97	0.81
RED HOOK	NY	84532.	37348.	86.	0.64*	0.81*
ONEONTA	NY	19625.	87198.	0.	0.53	0.71
ANGOLA	NY	68251.	22277.	0.	0.67	0.60
OLEAN	NY	51267.	29490.	0.	1.78	0.54
SENECA FALLS	NY	57587.	18797.	0.	0.62	0.51
ORCHARD PARK	NY	54191.	17692.	0.	0.58	0.48
LAKE PLACID	NY	32267.	37455.	0.	0.45	0.46
TROY	NY	9749.	56912.	0.	0.32	0.44
LANCASTER	NY	46529.	15192.	0.	0.49	0.41
CANASTOTA	NY	30498.	22229.	0.	0.38	0.35
PALMYRA	NY	31841.	20896.	0.	0.38	0.35
MATTITUCK	NY	27919.	22564.	0.	0.35	0.34
HAMBURG	NY	34774.	11351.	0.	0.36	0.31
CAMILLUS	NY	34391.	11227.	0.	0.37	0.30
MALONE	NY	16560.	27966.	0.	0.27	0.30
CORNING	NY	25427.	18306.	0.	0.30	0.29
LE ROY	NY	28815.	13009.	0.	0.31	0.28
HAMILTON	NY	34720.	6031.	36.	0.23*	0.27*
MONTAUK	NY	11229.	21460.	0.	0.19	0.22
FRANKFORT /UTICA/	NY	23750.	7752.	0.	0.25	0.21
NEW BREMEN	NY	7829.	20421.	0.	0.16	0.19
CICEPO	NY	16956.	10547.	0.	0.20	0.18
PERRY	NY	18005.	7052.	0.	0.20	0.17
MAHOPAC	NY	17411.	7571.	0.	0.19	0.17
EAST AMHERST	NY	18612.	6077.	0.	0.19	0.16

AEA	N72	WARWICK MUNI	WARWICK	18669.	6095.	0.	0.20	0.16
AEA	NK03	KAMP	DURHAMVILLE	16316.	5490.	0.	0.18	0.15
AEA	D70	HONEOYE FALLS	HONEOYE FALLS	16555.	5405.	0.	0.17	0.15
AEA	8G3	GIERMEK EXECUTIVE	OLEAN	15836.	5169.	0.	0.16	0.14
AEA	NY27	FULCO	JOHNSTOWN	14944.	4878.	0.	0.16	0.13
AEA	23N	EDWARDS	BAYPORT	9946.	8870.	0.	0.13	0.13
AEA	480	SOUTH ALBANY	SOUTH BETHLEHEM	13078.	4270.	0.	0.14	0.12
AEA	D38	CANANDAIGUA	CANANDAIGUA	12204.	3983.	0.	0.13	0.11
AEA	NY55	BURRELLO-MECHANICVILLE	MECHANICVILLE	8905.	5417.	0.	0.10	0.10
AEA	N89	L.H.J./CHANNEL MASTER	ELLENVILLE	6743.	7204.	0.	0.09	0.09
AEA	NY20	NELLIS FIELD	FORT PLAIN	8012.	2615.	0.	0.09	0.07
AEA	9G5	ROYALTON	GASPORT	8504.	2776.	0.	0.09	0.07
AEA	N37	MONTICELLO	MONTICELLO	7048.	2480.	6.	0.05*	0.06*
AEA	B01	GRANVILLE	GRANVILLE	6513.	2597.	0.	0.07	0.06
AEA	PTD	POTS DAM MUNI/DAMON FLD/	POTS DAM	6904.	2253.	0.	0.07	0.06
AEA	4N2	CHENANGO BRIDGE	BINGHANTON	6505.	2123.	0.	0.07	0.06
AEA	481	DUANESBURG	DUANESBURG	6734.	2199.	0.	0.07	0.06
AEA	7N2	PEEKSKILL	PEEKSKILL	5354.	1748.	0.	0.06	0.05
AEA	D80	PALMER	OLCOIT	5117.	1670.	0.	0.05	0.05
AEA	B16	WHITFORDS	WEEDSPORT	5592.	1825.	0.	0.06	0.05
AEA	NY23	RYDERS SKYPORT	GOVERNOUR	2205.	3230.	0.	0.03	0.04
AEA	41N	FEF AIRPARK INC.	ONEONTA	3710.	696.	3.	0.02*	0.03*
AEA	NY54	COOPERSTOWN-WESTVILLE	WESTVILLE	2384.	1779.	0.	0.03	0.03
AEA	D79	DART	HAYVILLE	1894.	618.	0.	0.02	0.02
AEA	1N2	SPADARO	EAST MORICHES	2073.	677.	0.	0.02	0.02
AEA	NY03	ATHENS	ATHENS	935.	305.	0.	0.01	0.01
AEA	G08	ROSTRAVER	MONONGAHELA	1582569.	315030.	1544.	10.04*	12.61*
AEA	N25	BOB SHANNON MEMORIAL FIELD	DOWNTOWN	1119470.	227241.	1060.	6.98*	8.95*
AEA	40N	CHESTER COUNTY G O CARLSON	COATESVILLE	853697.	255518.	853.	4.45	7.37
AEA	1N9	ALLEN TOWN QUEEN CITY MUNI	ALLEN TOWN	763764.	211316.	732.	4.98*	6.48*
AEA	LBE	WESTMORELAND COUNTY	LATROBE	719481.	226791.	771.	6.49*	6.29*
AEA	JST	JOHNSTOWN-CAMBRIA COUNTY	JOHNSTOWN	638572.	201590.	793.	2.16	5.58
AEA	N67	WINGS FIELD	PHILADELPHIA	538121.	216958.	408.	3.70	5.02
AEA	G01	BEAVER COUNTY	BEAVER FALLS	497904.	193863.	481.	3.49*	4.60*
AEA	BTP	BUTLER-GRAHAM	BUTLER	527346.	153260.	402.	3.65*	4.52*
AEA	N10	PERKIOMEN VALLEY	COLLEGEVILLE	524507.	129302.	524.	2.43	4.34
AEA	DUJ	DU BOIS-JEFFERSON COUNTY	DU BOIS	445567.	172018.	512.	1.56	4.10
AEA	3G2	WASHINGTON COUNTY	WASHINGTON	411433.	186666.	371.	3.27*	3.97*
AEA	N57	THE NEW GARDEN FLYING FLD	TOUGHKENAMON	436355.	106074.	398.	2.31	3.60
AEA	UKT	QUAKERTOWN	QUAKERTOWN	370687.	168623.	360.	2.44	3.58
AEA	BFD	BRADFORD REGIONAL	BRADFORD	387965.	151560.	447.	1.27	3.58
AEA	N88	DOYLESTOWN	DOYLESTOWN	375123.	159362.	328.	2.41	3.55
AEA	N34	TURNER FIELD	PROSPECTVILLE	338315.	194751.	137.	3.16	3.54
AEA	THV	YORK	YORK	419625.	113334.	413.	2.79*	3.54*
AEA	A00	ALTOONA-BLAIR COUNTY	ALTOONA	363102.	166138.	391.	3.19*	3.52*
AEA	N46	POTTSTOWN LIMERICK	POTTSTOWN	270734.	165034.	186.	2.42*	2.90*
AEA	N47	POTTSTOWN MUNI	POTTSTOWN	239879.	147251.	235.	1.94*	2.57*
AEA	N43	EASTON	EASTON	264348.	118418.	238.	1.78*	2.54*
AEA	FKL	CHESS-LAMBERTON	FRANKLIN	227968.	139665.	248.	0.98	2.43*
AEA	2G7	NEW CASTLE MUNI	NEW CASTLE	228980.	76468.	247.	1.91*	2.43*
AEA	2G9	SOMERSET COUNTY	SOMERSET	264440.	86029.	277.	1.07	2.33
AEA	2G6	PORT MEADVILLE	MEADVILLE	175753.	117245.	178.	0.91	1.95
AEA	H2L	HAZLETON MUNI	HAZLETON	197516.	84497.	194.	1.19	1.87
AEA	8G4	CAMPBELL	PITTSBURGH	212331.	63358.	200.	0.94	1.83
AEA	PSB	MID-STATE	PHILIPSBURG	137727.	127486.	145.	1.12	1.76
AEA	UNV	UNIVERSITY PARK	STATE COLLEGE	100650.	138214.	0.	1.50	1.59
AEA	MPO	POCONO MOUNTAINS MUNI	MT POCONO	156764.	78615.	146.	1.14	1.56
AEA	N65	3-M	BRISTOL	140062.	84782.	101.	1.10*	1.49*
AEA	LHV	W T PIPER MEML	LOCK HAVEN	156793.	51178.	0.	1.62	1.38

AEA	SEG	PENN VALLEY	SELINGSGROVE	PA	111315.	81234.	97.	0.91*	1.28*
AEA	430	CHERRY RIDGE	HONESDALE	PA	155675.	35683.	130.	1.01*	1.27*
AEA	460	PITTSBURGH-MONROEVILLE	MONROEVILLE	PA	119447.	63838.	0.	1.33	1.22
AEA	8G5	ST MARYS MUNI	ST MARYS	PA	127411.	41174.	132.	0.63	1.12
AEA	IDI	INDIANA COUNTY/JIMMY STEWART FLD/	INDIANA	PA	46934.	120732.	0.	1.38	1.11
AEA	N27	TOWANDA	TOWANDA	PA	37009.	111833.	67.	0.96	0.99
AEA	N34	WILKES-BARRE WYOMING VALLEY	WILKES-BARRE	PA	67498.	81998.	0.	0.92	0.99
AEA	N68	CHAMBERSBURG MUNICIPAL	CHAMBERSBURG	PA	91644.	52989.	85.	0.75*	0.96*
AEA	5G8	PITTSBURGH BOQUET AIRPARK	JEANNETTE	PA	106070.	37108.	0.	1.11	0.95*
AEA	8G7	ZELIENOPLE MUNICIPAL	ZELIENOPLE	PA	101423.	38412.	0.	0.88	0.93
AEA	RVL	MIFFLIN COUNTY	REEDSVILLE	PA	71841.	65547.	51.	0.70*	0.91*
AEA	2G3	CONNELLSVILLE	CONNELLSVILLE	PA	100642.	33959.	1.	1.67	0.89
AEA	9N1	VANSANT	ERVINNA	PA	98887.	32284.	0.	0.99	0.87
AEA	4G1	GREENVILLE MUNI	GREENVILLE	PA	106493.	24195.	69.	0.76*	0.87*
AEA	8G2	LAWRENCE	CORRY	PA	95785.	29153.	94.	0.39	0.83
AEA	9G8	EBENSBURG	EBENSBURG	PA	97116.	21238.	68.	0.67*	0.79*
AEA	N99	BRANDYWINE	WEST CHESTER	PA	84628.	30583.	0.	0.89	0.77
AEA	6G1	TITUSVILLE	TITUSVILLE	PA	98454.	17289.	97.	0.62*	0.77*
AEA	N70	PENNRIDGE	PERKASIE	PA	73766.	32360.	0.	0.79	0.71
AEA	8N9	WARRINGTON	DOYLESTOWN	PA	179.	105422.	0.	0.51	0.70
AEA	4G9	GREENE COUNTY	WAYNESBURG	PA	74861.	24435.	0.	0.78	0.66
AEA	469	BEDFORD	BEDFORD	PA	13375.	59524.	0.	0.32	0.48
AEA	ZER	SCHUYLKILL COUNTY /JOE ZERBEY/	POTTSVILLE	PA	55384.	15638.	48.	0.36*	0.47*
AEA	N29	HERSHEY AIR PARK	HERSHEY	PA	47594.	19791.	45.	0.33*	0.45*
AEA	G07	MOUNT PLEASANT-SCOTTDAL	MOUNT PLEASANT	PA	49313.	16098.	0.	0.51	0.43
AEA	N31	KUTZTOWN AIRPARK	KUTZTOWN	PA	45713.	16030.	0.	0.46	0.41
AEA	N54	BUEHL FIELD	LANGHORNE	PA	43943.	14663.	30.	0.31	0.39
AEA	9G1	WEST PENN	TARENTUM	PA	37948.	17328.	0.	0.41	0.37
AEA	N94	CARLISLE	CARLISLE	PA	39084.	12758.	0.	0.41	0.34
AEA	29D	GROVE CITY	GROVE CITY	PA	29793.	21650.	0.	0.80	0.34
AEA	N38	GRAND CANYON STATE	WELLSBORO	PA	41701.	7305.	41.	0.26*	0.33*
AEA	N13	BLOOMSBURG MUNI	BLOOMSBURG	PA	20459.	24644.	0.	0.72	0.30
AEA	G05	FINLEYVILLE	FINLEYVILLE	PA	31386.	10245.	0.	0.33	0.28
AEA	3G1	ERIE COUNTY	WATTSBURG	PA	31092.	10150.	0.	0.31	0.27
AEA	6W6	HANOVER	HANOVER	PA	24342.	16230.	0.	0.27	0.27
AEA	N76	MILLARD	ANNVILLE	PA	10407.	28292.	0.	0.20	0.26
AEA	PA21	WEST MIDDLESEX	WEST MIDDLESEX	PA	29616.	9669.	0.	0.30	0.26
AEA	N79	NORTHUMBERLAND COUNTY	SHAMOKIN	PA	9329.	27929.	0.	0.29	0.25
AEA	N96	BELLEFRONTE SKYPARK	BELLEFRONTE	PA	7009.	29867.	0.	0.17	0.25
AEA	N74	PENNS CAVE	CENTRE HALL	PA	7525.	30036.	0.	0.17	0.25
AEA	3G9	BUTLER FARM SHOW	BUTLER	PA	28688.	9365.	0.	0.29	0.25
AEA	11D	CLARION COUNTY	CLARION	PA	9947.	23143.	0.	0.18	0.22
AEA	N97	CLEARFIELD-LAWRENCE	CLEARFIELD	PA	26835.	7027.	21.	0.16	0.22
AEA	N53	STROUDSBURG-POCONO AIRPARK	EAST STROUDSBURG	PA	24157.	4845.	20.	0.16*	0.19*
AEA	22N	CARBON COUNTY	LEHIGHTON	PA	18717.	10363.	33.	0.30	0.19
AEA	31D	BUTTER VALLEY GOLF PORT	IRWIN	PA	20749.	6774.	0.	0.21	0.18
AEA	7N8	DEVENER	BALLY	PA	18963.	6189.	0.	0.19	0.17
AEA	2W7	SKYHAVEN	HANOVER	PA	19153.	6253.	0.	0.20	0.17
AEA	6W7	BATTLEFIELD	TUNKHANNOCK	PA	12330.	12324.	0.	0.15	0.16
AEA	57N	OXFORD	GETTYSBURG	PA	16109.	5260.	0.	0.16	0.14
AEA	7G3	LEECHBURG	OXFORD	PA	15528.	5069.	0.	0.16	0.14
AEA	N71	ELIZABETHTOWN-MARIETTA INC	LEECHBURG	PA	14370.	4692.	0.	0.14	0.13
AEA	N05	DOERSOM	MT JOY /MARIETTA/	PA	14625.	4773.	0.	0.15	0.13
AEA	9W8	BAUBLITZ COMMERCIAL	GETTYSBURG	PA	15035.	4909.	0.	0.15	0.13
AEA	9N3	SEAMANS FLD	BROGUE	PA	14534.	4745.	0.	0.15	0.13
AEA	SCE	STATE COLLEGE AIR DEPOT	FACTORYVILLE	PA	9163.	8507.	0.	0.11	0.12
AEA	22D	BANDEL	STATE COLLEGE	PA	14311.	2722.	13.	0.04*	0.11*
AEA	89N	CENTRAL MANOR	EIGHTY FOUR	PA	10100.	5506.	0.	0.11	0.10
AEA	26D	KEYSTONE PARK	MOUNTVILLE	PA	11476.	3747.	0.	0.12	0.10
			EMPORIUM	PA	9975.	3256.	0.	0.10	0.09

AEA N16	CENTRE AIRPARK	PA	8617.	2813.	0.	0.09	0.08
AEA G06	MC VILLE	PA	8360.	2893.	0.	0.09	0.08
AEA N35	PUNXSUTAWNEY	PA	9067.	2960.	0.	0.09	0.08
AEA PA11	BROKENSTRAW	PA	7783.	4749.	0.	0.09	0.08
AEA PA22	HERMITAGE	PA	8755.	2858.	0.	0.09	0.08
AEA PA23	MIFFLINTOWN	PA	8445.	3301.	0.	0.09	0.08
AEA 07N	BERMUDIAN VALLEY AIRPARK	PA	8842.	2886.	0.	0.09	0.08
AEA PA08	MOORHEAD AIRPARK	PA	7922.	2586.	0.	0.08	0.07
AEA 69N	SLATINGTON	PA	8034.	2622.	0.	0.07	0.06
AEA N42	SENECA AIRPARK INC	PA	7158.	2337.	0.	0.07	0.06
AEA N32	SHIPPENSBURG	PA	6832.	2247.	0.	0.06	0.05
AEA 8N8	BLUE SWAN	PA	5917.	1932.	0.	0.06	0.05
AEA 7G4	DANVILLE	PA	5508.	1948.	0.	0.06	0.05
AEA PA06	BLUE KNOB VALLEY	PA	6110.	1995.	0.	0.06	0.05
AEA 9N9	LAKEHILL	PA	1429.	3005.	0.	0.02	0.03
AEA 1N3	HALLSTEAD	PA	3599.	1208.	0.	0.04	0.03
AEA 42N	ALBERT	PA	2974.	971.	0.	0.03	0.03
AEA 74N	LEBANON VALLEY AIRPARK	PA	3694.	1206.	0.	0.04	0.03
AEA 70N	BENDIGO	PA	2154.	703.	0.	0.02	0.02
AEA 8N6	SPRING HILL AIRPARK	PA	1798.	587.	0.	0.02	0.02
AEA 71N	CARBONDALE-CLIFFORD	PA	1623.	530.	0.	0.02	0.01
AEA 7SP	SUNDURY	PA	0.	76.	0.	0.00	0.00
AEA 7SP	SEVEN SPRINGS	PA	0.	76.	0.	0.00	0.00
AEA W09	LEESBURG MUNI/GODFREY/FIELD	VA	1066712.	197364.	907.	7.71	8.40
AEA W98	CHESTERFIELD COUNTY	VA	934683.	183265.	905.	5.20	7.43
AEA W07	SHANNON	VA	656279.	196520.	604.	4.57	5.67
AEA SHD	SHENANDOAH VALLEY	VA	527132.	191875.	544.	3.36	4.78
AEA W10	MANASSAS MUNI/HARRY P DAVIS FIELD	VA	346883.	208016.	0.	13.54	3.69
AEA LNP	LONESOME PINE	VA	218198.	139998.	212.	1.62	2.38
AEA MFV	ACCOMACK COUNTY	VA	282814.	72845.	276.	1.81	2.36
AEA W83	HANOVER COUNTY MUNI	VA	224220.	65403.	175.	2.05	1.92
AEA PVG	CHESAPEAKE PORTSMOUTH	VA	168447.	112262.	0.	6.60	1.87
AEA FKN	FRANKLIN MUNI-JOHN BEVERLY ROSE	VA	235048.	46088.	232.	1.91	1.87
AEA W66	WARRENTON-FAUQUIER	VA	197444.	63401.	131.	1.49	1.73
AEA PTB	PETERSBURG MUNI	VA	219761.	36756.	210.	1.06	1.70
AEA W70	WILLIAMSBURG-JAMESTOWN	VA	152579.	78456.	0.	5.28	1.54
AEA PSK	NEW RIVER VALLEY	VA	135323.	83348.	126.	0.85	1.45
AEA DAN	DANVILLE MUNI	VA	147224.	59486.	0.	1.32	1.37
AEA HSP	INGALLS FIELD	VA	98468.	79907.	84.	0.88	1.19
AEA W89	HOPEWELL	VA	151314.	25898.	141.	0.83	1.18
AEA W22	WOODBIDGE	VA	122746.	48470.	0.	1.23	1.14
AEA SAT	MOUNTAIN EMPIRE	VA	110282.	59134.	99.	0.75*	1.13*
AEA SFQ	SUFFOLK MUNI	VA	54441.	113941.	0.	1.91	1.12
AEA GVE	GORDONSVILLE MUNI	VA	129155.	27884.	122.	0.88*	1.04*
AEA W16	WINCHESTER MUNI	VA	70936.	53874.	0.	1.92	0.83
AEA W92	SKY BRYCE	VA	27592.	36719.	0.	0.52	0.76
AEA W48	VIRGINIA HIGHLANDS	VA	37284.	68987.	0.	1.24	0.71
AEA W13	WAYNESBORO	VA	14565.	86528.	0.	0.41	0.67
AEA TGI	TANGIER ISLAND	VA	20519.	74562.	0.	0.41	0.63
AEA W49	CULPEPER MUNI	VA	52338.	31428.	0.	1.39	0.56
AEA W93	ORANGE COUNTY	VA	42056.	42382.	0.	0.50	0.56
AEA W97	WEST POINT MUNI	VA	56980.	20807.	53.	0.42*	0.52*
AEA V P I	V P I	VA	28051.	46724.	0.	1.34	0.50
AEA W04	FALWELL	VA	14253.	59538.	0.	0.31	0.49
AEA W08	WILLIAM M TUCK	VA	30219.	37875.	0.	0.98	0.45
AEA W91	SMITH MOUNTAIN LAKE	VA	15602.	50286.	0.	0.29	0.44
AEA W93	SCUTH NORFOLK	VA	48306.	15768.	0.	0.47	0.43
AEA W93	EMPORIA MUNI	VA	25093.	37489.	0.	1.12	0.42
AEA W93	BLUE RIDGE	VA	40123.	22741.	135.	0.94	0.42
AEA W93	SEVEN SPRINGS BOROUGH	PA	0.	76.	0.	0.00	0.00
AEA W93	LEESBURG	VA	1066712.	197364.	907.	7.71	8.40
AEA W93	CHESTERFIELD	VA	934683.	183265.	905.	5.20	7.43
AEA W93	FREDERICKSBURG	VA	656279.	196520.	604.	4.57	5.67
AEA W93	STAUNTON/WAYNESB/HARRI	VA	527132.	191875.	544.	3.36	4.78
AEA W93	MANASSAS	VA	346883.	208016.	0.	13.54	3.69
AEA W93	WISE	VA	218198.	139998.	212.	1.62	2.38
AEA W93	MELFA	VA	282814.	72845.	276.	1.81	2.36
AEA W93	ASHLAND	VA	224220.	65403.	175.	2.05	1.92
AEA W93	PORTSMOUTH	VA	168447.	112262.	0.	6.60	1.87
AEA W93	FRANKLIN	VA	235048.	46088.	232.	1.91	1.87
AEA W93	MIDLAND	VA	197444.	63401.	131.	1.49	1.73
AEA W93	PETERSBURG	VA	219761.	36756.	210.	1.06	1.70
AEA W93	WILLIAMSBURG/JAMESTOWN	VA	152579.	78456.	0.	5.28	1.54
AEA W93	DUBLIN	VA	135323.	83348.	126.	0.85	1.45
AEA W93	DANVILLE	VA	147224.	59486.	0.	1.32	1.37
AEA W93	HOT SPRINGS	VA	98468.	79907.	84.	0.88	1.19
AEA W93	HOPEWELL	VA	151314.	25898.	141.	0.83	1.18
AEA W93	WOODBIDGE	VA	122746.	48470.	0.	1.23	1.14
AEA W93	MARION/WYTHEVILLE	VA	110282.	59134.	99.	0.75*	1.13*
AEA W93	SUFFOLK	VA	54441.	113941.	0.	1.91	1.12
AEA W93	GORDONSVILLE	VA	129155.	27884.	122.	0.88*	1.04*
AEA W93	WINCHESTER	VA	70936.	53874.	0.	1.92	0.83
AEA W93	BAYE	VA	27592.	36719.	0.	0.52	0.76
AEA W93	ABINGDON	VA	37284.	68987.	0.	1.24	0.71
AEA W93	WAYNESBORO	VA	14565.	86528.	0.	0.41	0.67
AEA W93	TANGIER	VA	20519.	74562.	0.	0.41	0.63
AEA W93	CULPEPER	VA	52338.	31428.	0.	1.39	0.56
AEA W93	ORANGE	VA	42056.	42382.	0.	0.50	0.56
AEA W93	WEST POINT	VA	56980.	20807.	53.	0.42*	0.52*
AEA W93	BLACKSBURG	VA	28051.	46724.	0.	1.34	0.50
AEA W93	LYNCHBURG	VA	14253.	59538.	0.	0.31	0.49
AEA W93	SOUTH BOSTON	VA	30219.	37875.	0.	0.98	0.45
AEA W93	MONEIA	VA	15602.	50286.	0.	0.29	0.44
AEA W93	CHESAPEAKE	VA	48306.	15768.	0.	0.47	0.43
AEA W93	EMPORIA	VA	25093.	37489.	0.	1.12	0.42
AEA W93	MARTINSVILLE	VA	40123.	22741.	135.	0.94	0.42

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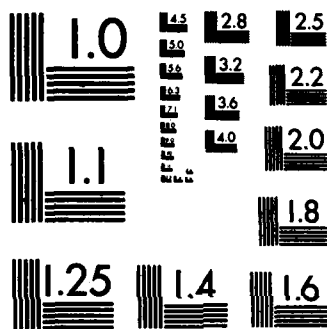
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

AEA W90	NEW LONDON	FOREST	41991.	13708.	0.	0.40	0.37
AEA AEA	GRUNDY MUNI	GRUNDY	25629.	22417.	0.	0.29	0.32
AEA AEA	FRONT ROYAL-WARREN COUNTY	FRONT ROYAL	31909.	16198.	0.	0.33	0.32
AEA AEA	ALLEN PERKINSON MUNI	BLACKSTONE	26359.	11400.	0.	0.30	0.25
AEA AEA	RICHLANDS MUNI	RICHLANDS	23390.	13420.	0.	0.25	0.24
AEA AEA	GLOUCESTER	GLOUCESTER	20683.	6749.	0.	1.08	0.18
AEA AEA	NEW KENT COUNTY	QUINTON	12583.	12642.	0.	0.15	0.17
AEA AEA	FARMVILLE MUNI	FARMVILLE	10039.	14454.	0.	0.13	0.16
AEA AEA	WAKEFIELD MUNI	WAKEFIELD	18256.	5957.	0.	0.88	0.16
AEA AEA	BRIDGEWATER AIR PARK	BRIDGEWATER	16004.	5224.	0.	0.15	0.14
AEA AEA	NEW MARKET	NEW MARKET	8717.	12267.	0.	0.11	0.14
AEA AEA	CREWE MUNI	CREWE	14625.	4773.	0.	0.15	0.13
AEA AEA	LURAY CAVERNS	LURAY	12036.	5635.	2.	0.52	0.12
AEA AEA	LEE COUNTY	PENNINGTON GAP	5768.	7680.	0.	0.20	0.09
AEA AEA	TWIN COUNTY	GALAX/HILLSVILLE	7363.	2403.	0.	0.22	0.06
AEA AEA	LAWRENCEVILLE/BRUNSWICK MUNI	LAWRENCEVILLE	5971.	1949.	0.	0.29	0.05
AEA AEA	LUNENBURG COUNTY	KENBRIDGE	2762.	3699.	0.	0.04	0.04
AEA BLF	MERCER COUNTY	BLUEFIELD	516035.	187907.	535.	2.25	4.68
AEA MRB	EASTERN WEST VIRGINIA REGIONAL ARPT	MARTINSBURG	338940.	154776.	329.	2.64	3.28
AEA SSU	GREENBRIER	WHITE SULPHUR SPRINGS	303597.	155689.	296.	2.54	3.05
AEA AEA	BUCKHANNON-UPSHUR COUNTY	BUCKHANNON	42789.	119328.	0.	0.93	1.08
AEA AEA	SUMMERSVILLE	SUMMERSVILLE	26128.	113892.	0.	1.37	0.93
AEA AEA	MASON COUNTY	POINT PLEASANT	71175.	34531.	62.	0.49	0.70
AEA AEA	KEE FLD	PINEVILLE	73835.	21370.	50.	0.51	0.63
AEA AEA	MINGO COUNTY	WILLIAMSON	15715.	63033.	0.	0.36	0.52
AEA AEA	BRAXTON COUNTY	SUTTON	11930.	56869.	0.	0.29	0.46
AEA AEA	JACKSON COUNTY	RAVENSWOOD	4966.	57331.	0.	0.24	0.41
AEA AEA	GRANT COUNTY	PETERSBURG	23725.	23545.	0.	0.30	0.31
AEA AEA	FAIRMONT MUNI	FAIRMONT	21292.	7455.	13.	0.16	0.19
AEA AEA	MCDONALD FIELD	TAPLIN	3795.	23523.	0.	0.11	0.18
AEA AEA	HINTON-ALDERSON	PENCE SPRINGS	7235.	19092.	0.	0.13	0.18
AEA AEA	HERRON	NEW CUMBERLAND	18100.	5909.	0.	0.18	0.16
AEA AEA	MARSHALL COUNTY	MOUNDSVILLE	7906.	9327.	0.	0.10	0.11
AEA AEA	POTOMAC AIRPARK	BERKELEY SPRINGS	12075.	2070.	11.	0.09	0.09
AEA AEA	ROBERT NEWLON FLD	HUNTINGTON	8657.	2826.	0.	0.09	0.08
AEA AEA	NEW RIVER GORGE	LANSING	6365.	2078.	0.	0.06	0.06
AEA AEA	WELCH MUNI	WELCH	6783.	2215.	0.	0.07	0.06
AEA AEA	SLATE RUN	SPENCER	5169.	2801.	0.	0.06	0.05
AEA AEA	FAYETTE	FAYETTEVILLE	0.	5792.	0.	0.02	0.04

GREAT LAKES REGION

AGL UGN	WAUKEGAN MEMORIAL	WAUKEGAN	2174053.	465236.	2252.	10.11	17.54
AGL LOT	LEWIS UNIVERSITY	ROMBOVILLE	1982273.	385352.	2009.	10.20	15.73
AGL JOT	JOLIET MUNI	JOLIET	1195687.	273011.	1260.	6.62	9.76
AGL UIN	QUINCY MUNI BALDWIN FIELD	QUINCY	1007667.	268312.	1088.	6.17	8.48
AGL MVN	MT VERNON-OUTLAND	MT VERNON	928502.	248997.	1058.	6.10	7.82
AGL IKK	GREATER KANKAKEE	KANKAKEE	828557.	154896.	865.	4.04	6.53
AGL C06	ELGIN	ELGIN	694207.	228636.	623.	4.35	6.13
AGL LMV	LAWRENCEVILLE-VINCENNES MUNI	LAWRENCEVILLE	725586.	167027.	721.	4.79	5.93
AGL MTO	COLES COUNTY MEMORIAL	MATTOON-CHARLESTON	681951.	201816.	719.	3.57	5.87
AGL 3HA	LANSING MUNICIPAL	CHICAGO	610105.	216021.	553.	4.08	5.49
AGL C18	FRANKFORT	FRANKFORT	680957.	130450.	723.	3.03	5.39
AGL 3CK	CRYSTAL LAKE	CRYSTAL LAKE	554221.	203193.	455.	3.31	5.03
AGL C81	CAMPBELL	GRAYS LAKE	586917.	120497.	547.	3.58	4.70
AGL C16	ILLINI	URBANA	489226.	164880.	446.	3.36	4.35
AGL SQI	WHITESIDE CO ARPT-JOS H BITTORF FLD	STERLING ROCKFALLS	357599.	165446.	376.	2.19	3.48

AGL	3MY	MOUNT HANLEY AUXILIARY	PEORIA	389396	117939	382	2.66*	3.37*
AGL	C77	BELVIDERE LTD	BELVIDERE	316982	156924	290	2.25*	3.15*
AGL	C56	SANGER	MONEE	397725	71510	393	2.45*	3.12
AGL	10C	GALT FIELD	GREENWOOD/WONDER LAKE	327421	118153	310	2.27*	2.96*
AGL	SLO	SALEM-LECKRONE	SALEM	275834	121688	270	2.13	2.64
AGL	ENL	CENTRALIA MUNI	CENTRALIA	271574	123770	280	1.82	2.63
AGL	1C5	CLOW INTL	PLAINFIELD	235867	149355	0	2.66	2.56
AGL	RSV	ROBINSON MUNI	ROBINSON	301957	80488	312	2.12	2.54
AGL	FEP	THE ALBERTUS	FREPORT	298911	69176	308	1.61	2.45
AGL	12C	ROCHELLE MUN	ROCHELLE	280115	58893	280	1.84*	2.25*
AGL	IJX	JACKSONVILLE MUNI	JACKSONVILLE	179372	139787	160	1.65	2.12
AGL	3HW	HOMELL	CHICAGO/BLUE ISLAND/	162755	146188	0	2.00	2.05
AGL	C73	DIXON MUNI-CHARLES R. WALGREEN FIELD	DIXON	230479	57254	229	1.53*	1.91*
AGL	C09	MORRIS MUNI	MORRIS	167859	87846	165	1.27*	1.70*
AGL	C15	PEKIN MUNI	PEKIN	102975	38976	0	3.65	1.61
AGL	C45	WADDELL	MANITO	193624	35511	195	1.26*	1.56*
AGL	DLY	OLNEY-NOBLE	OLNEY-NOBLE	115632	114319	109	1.21	1.53
AGL	06C	CHICAGO/SCHAUMBURG	CHICAGO/SCHAUMBURG	100005	125712	0	1.41	1.50
AGL	HSB	HARRISBURG-RALEIGH	HARRISBURG	159000	62836	152	1.35	1.47
AGL	3LC	LOGAN COUNTY	LINCOLN	163524	43793	160	1.10	1.32
AGL	0C0	DACY	HARVARD	149915	48935	0	1.59	1.32
AGL	SAR	SPARTA COMMUNITY-HUNTER FIELD	SPARTA	138244	52038	0	0.32	1.26
AGL	3K6	SHAFFER METRO EAST	ST JACOB	107610	68335	0	1.21	1.17
AGL	2H3	FAIRFIELD MUNI	FAIRFIELD	128616	35124	110	0.90	1.09
AGL	1H8	CASEY MUNI	CASEY	102893	46905	72	0.82	1.00
AGL	C75	MARSHALL COUNTY	LACON	116265	25376	115	0.77*	0.94*
AGL	2H0	SHELBY COUNTY	SHELBYVILLE	38161	70368	0	0.62	0.72
AGL	1M0	CAIRO	CAIRO	24310	83144	0	0.54	0.71
AGL	VLA	VANDALIA MUNI	VANDALIA	81966	24263	80	0.59	0.71
AGL	MQB	MACOMB MUNICIPAL	MACOMB	40309	55485	0	1.36	0.64
AGL	GRE	GREENVILLE	GREENVILLE	64720	26883	58	0.64	0.61
AGL	C80	WAGON WHEEL	ROCKTON	66705	24610	66	0.47*	0.60*
AGL	DKB	DEKALB MUNI	DEKALB	56776	31841	0	0.62	0.59
AGL	C34	GIBSON CITY MUNI	GIBSON CITY	71729	12824	70	0.45*	0.56*
AGL	C66	MONMOUTH MUNICIPAL	MONMOUTH	28680	55193	0	1.05	0.56
AGL	C48	SANDWICH	SANDWICH	57079	18632	0	0.58	0.50
AGL	C07	KEWANEE MUNI	KEWANEE	32111	39382	0	1.09	0.48
AGL	PRG	EDGAR COUNTY	PARIS	25501	46979	0	1.06	0.48
AGL	CTK	INGERSOLL	CANTON	36595	29345	0	1.18	0.44
AGL	H07	HIGHLAND-WINET	HIGHLAND	44022	19160	0	0.49	0.42
AGL	1H2	EFFINGHAM COUNTY MEMORIAL	EFFINGHAM	28590	33418	0	0.96	0.41
AGL	M30	METROPOLIS MUNI	METROPOLIS	18826	39917	0	0.33	0.39
AGL	3LF	LITCHFIELD MUNI	LITCHFIELD	30027	29065	0	0.39	0.39
AGL	PPQ	PITTSFIELD PENSTONE MUNICIPAL	PITTSFIELD	19708	35671	0	0.78	0.37
AGL	C13	OTTAWA	OTTAWA	28087	26515	0	0.34	0.36
AGL	1C8	COTTONWOOD	ROCKFORD	25076	27450	0	0.34	0.35
AGL	C95	WOODS FIELD	EAST MOLINE	38051	12420	0	0.39	0.34
AGL	CUL	CARMI MUNI	CARMI	36163	11803	0	1.37	0.32
AGL	H96	BENTON MUNI	BENTON	29519	17622	0	0.33	0.31
AGL	C54	VALLEY	SPRING VALLEY	13292	31400	0	0.24	0.30
AGL	DTG	DAUGHT	DWIGHT	24591	16014	0	0.28	0.27
AGL	STQ	ROME AVIATION	STREATOR	15015	26186	0	0.23	0.27
AGL	K06	GREATER BEARDSTOWN	BEARDSTOWN	16450	15008	0	0.21	0.21
AGL	3TV	TAYLORVILLE MUNI	TAYLORVILLE	20638	10959	0	0.23	0.21
AGL	C82	BRESSON AIRPORT	COMPTON	16642	13419	0	0.20	0.20
AGL	C41	PIPER	PRINCETON	15503	13048	0	0.19	0.19
AGL	79IL	MILFORD	MILFORD	13337	15012	0	0.17	0.19
AGL	1C2	NEW LENOX-HOWELL	NEW LENOX	18015	11202	0	0.20	0.19
AGL	3KK	KANKAKEE	KANKAKEE	20537	6704	0	0.22	0.18
AGL	C00	MERCER COUNTY	ALEDO	16006	9976	0	0.19	0.17

AGL H84	FLORA MUNI	FLORA	6853.	16713.	1531.	0.	0.26	0.16
AGL 0C3	WILHELMI FIELD	JOLIET	15458.	5046.	1207.	0.	0.16	0.14
AGL 0C8	SPONHOLTZ	NEWARK	13374.	4366.	837.	0.	0.14	0.12
AGL 102	MT CARMEL MUNI	MT CARMEL	11018.	6100.	848.	0.	0.13	0.11
AGL K96	TUSCOLA	TUSCOLA	9806.	3201.	641.	0.	0.10	0.09
AGL 0C7	GRANDPAS' FARM MENDOTA	MENDOTA	4097.	5336.	415.	0.	0.06	0.06
AGL C51	HAVANA	HAVANA	4757.	1553.	356.	0.	0.05	0.04
AGL BDF	RINKENBERGER	BRADFORD	1089.	355.	405.	0.	0.01	0.01
AGL VPZ	PORTER COUNTY MUNI	VALPARAISO	1417583.	297272.	1531.	224.	6.41	11.39
AGL GYY	GARY MUNI	GARY	1229950.	210965.	1207.	8.32*	9.57*	9.57*
AGL EKM	ELKHART MUNI	ELKHART	798441.	239728.	837.	6.05*	6.90*	6.90*
AGL BAK	COLUMBUS BAKALAR MUNI	COLUMBUS	774227.	235313.	848.	3.78	3.78	6.71
AGL OKK	KOKOMO MUNI	KOKOMO	618219.	208087.	641.	3.26	3.26	5.49
AGL RID	RICHMOND MUNI	RICHMOND	614603.	132012.	634.	3.44	3.44	4.96
AGL 418	INDIANAPOLIS METROPOLITAN	INDIANAPOLIS	483706.	186857.	498.	3.25	3.25	4.46
AGL C65	PLYMOUTH MUNI	PLYMOUTH	458425.	182150.	475.	2.32	2.32	4.26
AGL AID	ANDERSON MUNI	ANDERSON	405621.	174114.	415.	3.35*	3.35*	3.85*
AGL MZZ	MARION MUNI	MARION	372994.	165982.	356.	2.17	2.17	3.58
AGL 3FK	FRANKLIN	FRANKLIN	364398.	169867.	356.	2.74*	2.74*	3.55*
AGL GSH	GOSHEN MUNI	GOSHEN	390617.	90464.	405.	1.69	1.69	3.20
AGL SMD	SMITH FIELD	FORT WAYNE	316569.	150902.	303.	1.88	1.88	3.11
AGL 05C	GRIFFITH	GRIFFITH	326930.	100868.	331.	1.84	1.84	2.84
AGL MGC	MICHIGAN CITY	MICHIGAN CITY	229687.	143404.	240.	1.57	1.57	2.48
AGL 122	RANDOLPH COUNTY	GREENHESTER	223887.	144530.	220.	1.81*	1.81*	2.45*
AGL 511	SKYWAY	GREENWOOD	222118.	144660.	208.	1.80*	1.80*	2.44*
AGL BFR	VIRGIL I GRISSOM MUNI	BEDFORD	240759.	115584.	245.	1.80	1.80	2.37
AGL ANQ	TRI-STATE STEUBEN COUNTY	ANGOLA	230719.	115570.	224.	1.81	1.81	2.30
AGL UWL	NEW CASTLE-HENRY CO. MUNI.	NEW CASTLE	242307.	81943.	245.	1.22	1.22	2.15
AGL 03C	HUNTINGTON MUNI	HUNTINGTON	262322.	53394.	260.	1.70*	1.70*	2.10*
AGL ASH	WARSAM MUNI	WARSAM	222318.	87071.	230.	1.21	1.21	2.06
AGL C39	MICHIGAN CITY MUNI	MICHIGAN CITY	260439.	43003.	299.	1.41*	1.41*	2.02
AGL 313	SKY KING	TERRE HAUTE	191237.	111849.	164.	1.48*	1.48*	2.01*
AGL 35M	SHELBYVILLE MUNI	SHELBYVILLE	226634.	68962.	221.	1.27	1.27	1.96
AGL 114	EAGLE CREEK AIRPARK	INDIANAPOLIS	139210.	150801.	0.	5.41	5.41	1.93
AGL C62	KENDALLVILLE MUNI	KENDALLVILLE	199732.	86388.	186.	1.41*	1.41*	1.90*
AGL RCR	FULTON COUNTY	ROCHESTER	210870.	42517.	216.	1.24	1.24	1.62
AGL CFJ	CRAWFORDSVILLE MUNI	CRAWFORDSVILLE	203264.	40363.	202.	1.15	1.15	1.62
AGL SER	FREEMAN MUNI	SEYMOUR	110977.	126450.	99.	1.44	1.44	1.58
AGL IMH	WABASH MUNI	WABASH	164497.	53249.	166.	1.01	1.01	1.45
AGL CEV	METTEL FIELD	CONNERSVILLE	144029.	47018.	110.	1.08	1.08	1.41
AGL 3AR	ARETZ	LAFAYETTE	124325.	83296.	0.	1.51	1.51	1.27
AGL 199	ALEXANDRIA	ALEXANDRIA	151153.	28926.	141.	0.75	0.75	1.20
AGL SIV	SULLIVAN COUNTY	SULLIVAN	127688.	49086.	124.	0.86	0.86	1.17
AGL 176	PERU MUNI	PERU	135711.	35217.	133.	0.69	0.69	1.14
AGL IMS	MADISON MUNI	MADISON	112361.	57752.	89.	0.83	0.83	1.13
AGL 121	INDIANAPOLIS BROOKSIDE AIRPARK	INDIANAPOLIS	129546.	37238.	98.	0.98	0.98	1.11
AGL 417	PUTNAM COUNTY	GREENCASTLE	128856.	23501.	122.	0.80*	0.80*	1.01*
AGL OEA	ONEAL	VINCENNES	122759.	21351.	123.	0.80*	0.80*	0.96*
AGL HNB	HUNTINGBURG	HUNTINGBURG	77403.	56442.	56.	0.85	0.85	0.89
AGL MCX	WHITE COUNTY	MONTECELLO	86807.	45102.	85.	0.59	0.59	0.88
AGL 138	HAPS	JEFFERSONVILLE	26990.	102668.	0.	0.65	0.65	0.86
AGL 152	INDIANAPOLIS TERRY	INDIANAPOLIS	87302.	40574.	83.	0.51	0.51	0.85
AGL DCY	DAVIESS COUNTY	WASHINGTON	84874.	27708.	0.	0.89	0.89	0.75
AGL TEL	PERRY COUNTY MUNI	TELL CITY	58069.	48779.	0.	1.57	1.57	0.71
AGL 501	KENTLAND MUNI	KENTLAND	40366.	43214.	41.	0.53*	0.53*	0.69*
AGL FRI	FRENCH LICK MUNI	FRENCH LICK	62582.	41778.	55.	0.72	0.72	0.69
AGL GGP	LOGANSPOUT MUNI	LOGANSPOUT	47403.	44931.	0.	0.58	0.58	0.61
AGL 35Y	SPEEDWAY	INDIANAPOLIS	69441.	22667.	0.	0.73	0.73	0.61
AGL 3HO	HOBART SKY RANCH	HOBART	61440.	27508.	0.	0.67	0.67	0.59

AGL	I01	BROWNSBURG	BROWNSBURG	IN	57697.	21544.	0.	0.61	0.53
AGL	3LP	LAPORTE MUNI	LAPORTE	IN	34493.	40458.	35.	0.36*	0.50*
AGL	07C	AUBURN DEKALB	AUBURN	IN	40630.	34245.	25.	0.36	0.50
AGL	FKR	FRANKFORT MUNI	FRANKFORT	IN	48653.	24004.	44.	0.34	0.48
AGL	514	SHERIDAN	SHERIDAN	IN	16049.	54891.	0.	0.35	0.47
AGL	C98	LAKE VILLAGE	LAKE VILLAGE	IN	49553.	16175.	0.	0.52	0.44
AGL	C64	WAWASEE	SYRACUSE	IN	28194.	35976.	0.	0.38	0.43
AGL	012	ARTHUR MUNI	BRAZIL	IN	48310.	8667.	47.	0.29	0.38
AGL	0V0	NORTH VERNON	NORTH VERNON	IN	42784.	13968.	0.	0.45	0.38
AGL	3HM	HALSMER	LAFAYETTE	IN	34241.	22837.	21.	0.31*	0.38*
AGL	I83	SALEM MUNI	SALEM	IN	16013.	35050.	0.	0.28	0.34
AGL	C03	NAPPANEE MUNI	NAPPANEE	IN	41155.	7689.	38.	0.26*	0.32*
AGL	712	REESE	MUNCIE	IN	28311.	13182.	0.	0.32	0.28
AGL	715	HIGHLAND	PERRYSVILLE	IN	28591.	11882.	0.	0.31	0.27
AGL	3C2	SHENK	GARRETT	IN	22788.	11718.	0.	0.24	0.23
AGL	I72	WESTFIELD	WESTFIELD	IN	22501.	7345.	0.	0.23	0.20
AGL	614	BOONE COUNTY	LEBANON	IN	22527.	7353.	0.	0.23	0.20
AGL	311	ELWOOD	ELWOOD	IN	19440.	10363.	0.	0.21	0.20
AGL	RZL	JASPER COUNTY	RENSSELAER	IN	21149.	6904.	0.	0.27	0.19
AGL	PLD	STEED FLD	PORTLAND	IN	8871.	17746.	22.	0.15*	0.18*
AGL	4C4	ARENS FIELD	WINAMAC	IN	23468.	4237.	0.	0.21	0.17
AGL	613	RUZICKA	KOKOMO	IN	19700.	6430.	0.	0.20	0.17
AGL	711	KELLYS AIRFIELD	MOORESVILLE	IN	18908.	6173.	0.	0.16	0.13
AGL	C92	MENTONE	MENTONE	IN	15150.	4945.	0.	0.14	0.12
AGL	GFD	POPE FIELD	GREENFIELD	IN	13049.	4260.	0.	0.14	0.12
AGL	C40	MILLER	BLUFFTON	IN	13991.	4567.	0.	0.14	0.12
AGL	C63	NEW CASTLE MUNI	NEW CASTLE	IN	13762.	4492.	0.	0.14	0.12
AGL	3C1	MISHAWAKA PILOTS CLUB	ELKHART	IN	10819.	2914.	30.	0.20	0.09
AGL	I13	SHAWNEE FIELD	BLOOMFIELD	IN	9898.	3231.	0.	0.10	0.09
AGL	3EV	SKYLANE	EVANSVILLE	IN	9879.	3225.	0.	0.10	0.09
AGL	I42	PAOLI MUNI	PAOLI	IN	7318.	3469.	0.	0.08	0.07
AGL	IN02	POST-AIRE	INDIANAPOLIS	IN	5655.	1846.	0.	0.06	0.05
AGL	671	D AND R AIRPARK	RUSHVILLE	IN	4082.	1333.	0.	0.04	0.04
AGL	I17	CLINTON	CLINTON	IN	2951.	963.	0.	0.03	0.03
AGL	I11	JESSUP	ANDERSON	IN	2730.	891.	0.	0.03	0.02
AGL	2IN2	MT COMFORT	INDIANAPOLIS	IN	1093.	303.	0.	0.01*	0.01*
AGL	3AE	ACE AIRPARK	ANDERSON	IN	1493.	487.	0.	0.02	0.01
AGL	I02	METTETAL	PLYMOUTH	MI	729407.	170340.	709.	4.71*	5.98*
AGL	Y70	IONIA COUNTY	IONIA	MI	560438.	179064.	591.	2.86	4.91
AGL	9D9	HASTINGS MUNI	HASTINGS	MI	591541.	132339.	624.	4.10	4.81
AGL	D92	CUSTER	MONROE	MI	512475.	186677.	540.	3.08	4.65
AGL	IMT	FORD	IRON MOUNTAIN/KINGSFOR	MI	512338.	188161.	550.	2.86	4.65
AGL	D98	ROMEO	ROMEO	MI	528660.	160606.	514.	3.54*	4.58*
AGL	3TR	JERRY TYLER MEML	NILES	MI	459840.	180788.	487.	2.32	4.26
AGL	ADG	THE LENAWEE COUNTY	ADRIAN	MI	540741.	96411.	566.	2.89	4.23
AGL	2G5	GROSSE ILE MUNI	DETROIT/GROSSE ILE	MI	518311.	112848.	369.	3.59*	4.19*
AGL	CMX	HOUGHTON COUNTY MEMORIAL	HANCOCK	MI	437813.	175751.	472.	2.02	4.08
AGL	3HE	LIVINGSTON COUNTY	HOWELL	MI	430884.	165340.	429.	2.56	3.96
AGL	4D0	ABRAMS MUNI	GRAND LEDGE	MI	492496.	85765.	316.	3.07*	3.84*
AGL	7D2	OAKLAND-TROY	TROY	MI	455087.	113131.	455.	3.04*	3.78*
AGL	0D1	SOUTH HAVEN MUNI	SOUTH HAVEN	MI	469238.	81868.	490.	2.44	3.66
AGL	GLR	OTSEGO COUNTY	GAYLORD	MI	373971.	167864.	397.	2.45	3.50
AGL	5D3	OMOSSO CITY	OLJOSO	MI	451588.	80101.	458.	2.37	3.53
AGL	PHN	ST CLAIR COUNTY INTL	PORT HURON	MI	411406.	76333.	380.	1.92	3.24
AGL	MNM	MEMORINEE-MARINETTE	MEMORINEE	MI	323328.	159026.	341.	2.28	3.20
AGL	3CM	JAMES CLEMENTS MUNI	BAY CITY	MI	333253.	155491.	323.	2.34*	3.11*
AGL	ESC	DELTA COUNTY	ESCANABA	MI	305723.	132134.	311.	2.05	3.06
AGL	C19	TULIP CITY	HOLLAND	MI	297400.	132134.	295.	2.17*	2.85*
AGL	Y47	OAKLAND SOUTHWEST	NEW HUDSON	MI	288061.	117960.	278.	2.03*	2.70*

AGL	Y84	MACKINAC ISLAND	MI	292834.	107147.	297.	2.16*	2.66*
AGL	C91	CASS COUNTY NEHL	MI	312685.	77871.	314.	2.13*	2.59*
AGL	5G9	WAGON WHEEL	MI	301285.	53913.	291.	1.88*	2.36*
AGL	0G9	SALEM	MI	300059.	54205.	290.	1.87*	2.35*
AGL	ACB	EMMET COUNTY	MI	209495.	137511.	239.	1.29	2.31
AGL	AMN	ANTRIM COUNTY	MI	199069.	139642.	201.	1.78	2.25
AGL	5D8	BROOKS FIELD	MI	208774.	129709.	213.	1.39	2.25
AGL	D95	DUPONT-LAPEER	MI	262673.	53175.	279.	1.14	2.10
AGL	Y15	CHEBOYGAN CITY-COUNTY	MI	256557.	57312.	251.	1.65*	2.09*
AGL	8D4	SPARTA	MI	179043.	134572.	209.	1.34	2.08
AGL	IND	GOGEBIC COUNTY	MI	168961.	134965.	167.	1.53*	2.02*
AGL	UIZ	BERZ-MACOMB	MI	163351.	133637.	158.	1.61	1.91
AGL	MQT	MARQUETTE COUNTY	MI	227681.	59436.	227.	1.46	1.91
AGL	MOP	MT PLEASANT MUNICIPAL	MI	124798.	146095.	0.	1.81	1.80
AGL	MBL	MANISTEE CO.-BLACKER	MI	224782.	43206.	229.	1.14	1.78
AGL	3GM	GRAND HAVEN MEML AIRPARK	MI	208865.	55971.	228.	0.98	1.76
AGL	09G	MASON JEWETT FIELD	MI	197759.	54367.	191.	1.30*	1.68*
AGL	CVX	CHARLEVOIX MUNI	MI	206337.	36437.	203.	1.31*	1.61*
AGL	07G	FITCH H BEACH	MI	130905.	102315.	135.	0.91	1.55
AGL	35D	PADGHAM FIELD	MI	177769.	52798.	189.	0.83	1.53
AGL	3TE	AL MEYERS	MI	178379.	42722.	194.	0.67	1.47
AGL	CAD	MEXFORD COUNTY	MI	169613.	32857.	164.	1.07*	1.35*
AGL	CIU	CHIPPEWA COUNTY	MI	116091.	52851.	116.	0.66	1.12
AGL	6D9	IOSCO COUNTY	MI	137434.	24263.	135.	0.87*	1.07*
AGL	Y85	HILLSDALE MUNI	MI	134496.	24742.	132.	0.85*	1.06*
AGL	3BB	BIG BEAVER	MI	113638.	37094.	0.	1.19	1.00
AGL	6D6	GREENVILLE MUNI	MI	36416.	113912.	0.	0.82	1.00
AGL	D13	MCKINLEY	MI	90044.	47925.	0.	1.01	0.92
AGL	77D	ROBEN-HOOD	MI	95737.	35848.	94.	0.67*	0.87*
AGL	3FM	FREMONT MUNI	MI	103962.	23008.	109.	0.46	0.84
AGL	D96	BRANCH COUNTY MEMORIAL	MI	75086.	41686.	49.	0.59	0.78
AGL	ISQ	SCHOOLCRAFT COUNTY	MI	93371.	20174.	98.	0.39	0.75
AGL	SJX	BEAVER ISLAND	MI	5649.	107207.	0.	0.56	0.75
AGL	IRS	KIRSCH MUNI	MI	34915.	68318.	0.	1.34	0.69
AGL	Y93	ATLANTA MUNI	MI	4540.	85759.	0.	0.36	0.60
AGL	3BS	JACK BARSTOW	MI	67862.	22124.	1.	2.15	0.60
AGL	83D	MACKINAC COUNTY	MI	10690.	74537.	0.	0.37	0.57
AGL	ERY	LUCE COUNTY HALE	MI	59265.	16402.	50.	0.34	0.50
AGL	78D	CARO MUNI	MI	58975.	10416.	58.	0.37*	0.46*
AGL	IMI6	ROSEDALE	MI	0.	63329.	0.	0.28	0.42
AGL	D87	HARBOR SPRINGS	MI	9591.	50568.	0.	0.28	0.40
AGL	3SG	HARRY W. BRONNE	MI	43624.	14241.	0.	1.06	0.38
AGL	57D	MACOMB	MI	40684.	14594.	0.	0.42	0.37
AGL	76G	MARINE CITY	MI	34168.	18242.	0.	0.38	0.35
AGL	43G	LARSEN AIR PARK	MI	39838.	13020.	0.	0.41	0.35
AGL	GDW	GLADWIN	MI	36186.	14314.	0.	0.39	0.34
AGL	3NP	BELFORD MAULE FIELD	MI	36683.	12039.	0.	0.38	0.33
AGL	1G4	SPENCER FIELD	MI	35704.	13225.	0.	0.37	0.33
AGL	1G4	HURON COUNTY MEMORIAL	MI	31394.	16034.	0.	0.35	0.32
AGL	76D	THREE RIVERS	MI	29355.	19042.	0.	0.98	0.32
AGL	HAI	GRAND RAPIDS	MI	35031.	11435.	0.	0.37	0.31
AGL	C05	SOUTH KENT	MI	34187.	11159.	0.	0.36	0.30
AGL	61D	OTSEGO-PLAINWELL MUNI	MI	28477.	14171.	0.	0.87	0.28
AGL	LDM	MASON COUNTY	MI	29744.	9709.	0.	0.30	0.26
AGL	99G	CARLS	MI	27724.	9049.	0.	0.28	0.24
AGL	2D8	DAVIS	MI	18858.	17926.	0.	0.25	0.24
AGL	C28	NEWAYGO	MI	24434.	11566.	0.	0.27	0.24
AGL	I3C	LAKEVIEW	MI	23051.	10147.	0.	0.24	0.22
AGL	37G	ALMONT	MI	27392.	4812.	27.	0.17*	0.21*
AGL	BFA	BOYNE MOUNTAIN	MI					

AGL	Y31	WEST BRANCH COMMUNITY	WEST BRANCH	23557.	7689.	0.	0.79	0.21
AGL	7Y0	TIMBERS SKY CAMP	SOUTH BRANCH	8327.	23633.	0.	0.16	0.21
AGL	D15	LAKE ISABELLA LANDING AREA	WEIDMAN	8236.	20997.	0.	0.15	0.19
AGL	42C	WHITE CLOUD	WHITE CLOUD	18244.	8458.	0.	0.20	0.18
AGL	OGM	ONTONAGON COUNTY	ONTONAGON	21845.	3910.	21.	0.14*	0.17*
AGL	39C	OSELKA	THREE OAKS	19033.	6213.	0.	0.19	0.17
AGL	5D7	MILAN	MILAN	18493.	6036.	0.	0.19	0.16
AGL	Y83	SANDUSKY CITY	SANDUSKY	15753.	7645.	0.	0.17	0.16
AGL	Y94	EAST JORDAN CITY	EAST JORDAN	13090.	9502.	0.	0.15	0.15
AGL	44G	BETZ	BLISSFIELD	16651.	5435.	0.	0.17	0.15
AGL	40C	WATERVLIET MUNI	WATERVLIET	15303.	5779.	0.	0.16	0.15
AGL	48D	CLARE MUNI	CLARE	12582.	6610.	0.	0.14	0.13
AGL	Y91	HOME ACRES SKY RANCH	LAKE CITY	12992.	6303.	0.	0.14	0.13
AGL	Y17	ACME SKYPORT	ACME	13306.	4633.	0.	0.14	0.12
AGL	41C	WAYLAND MUNI	WAYLAND	13657.	4461.	0.	0.14	0.12
AGL	65G	MAPLE GROVE	FOULERVILLE	14104.	4604.	0.	0.14	0.12
AGL	Y66	DRUMMOND ISLAND	DRUMMOND ISLAND	8469.	7640.	0.	0.11	0.11
AGL	C01	PILOT COUNTRY	COOPERSVILLE	12865.	4199.	0.	0.13	0.11
AGL	45G	HYNE FIELD	BRIGHTON	12795.	4178.	0.	0.13	0.11
AGL	55G	ARNOLD FIELD	CROSWELL	11897.	3883.	0.	0.12	0.10
AGL	88G	GRADOLPH FLD	PETERSBURG	11897.	3883.	0.	0.12	0.10
AGL	HLM	PARK TOWNSHIP	HOLLAND	21.	13503.	0.	0.05*	0.09*
AGL	3D4	CITY-COUNTY	FRANKFORT	3569.	7438.	0.	0.06	0.07
AGL	24C	LOWELL CITY	LOWELL	8327.	2718.	0.	0.08	0.07
AGL	98G	SEBEWAING	SEBEWAING	6335.	2231.	0.	0.07	0.06
AGL	RCT	MILLER FIELD	REED CITY	6476.	2113.	0.	0.07	0.06
AGL	3RC	ROSCOMMON CONSERVATION	ROSCOMMON	6766.	2209.	0.	0.07	0.06
AGL	80D	CLARE COUNTY	HARRISON	5739.	1873.	0.	0.06	0.05
AGL	09C	AUSTIN LAKE	KALAMAZOO	3749.	1224.	0.	0.04	0.03
AGL	D18	DOWNWIND ACRES	WILLIS	2593.	848.	0.	0.03	0.02
AGL	ANE	ANOKA COUNTY-BLAINE ARPT(JANES FIELD)	MINNEAPOLIS	1685813.	402190.	1767.	11.78*	13.87*
AGL	21D	LAKE ELMO	ST PAUL	1476545.	307368.	1414.	9.32*	11.85*
AGL	D97	SOUTH ST PAUL MUNI-RICHARD E FLEMING FLD	SOUTH ST PAUL	987086.	184762.	945.	6.15*	7.79*
AGL	INL	FALLS INTL	INTERNATIONAL FALLS	863829.	237896.	918.	3.63	7.32
AGL	HIB	CHISHOLM-HIBBING	HIBBING	707556.	215566.	834.	3.47	6.13
AGL	GPZ	GRAND RAPIDS ITASCA COUNTY	GRAND RAPIDS	670368.	213486.	678.	3.41	5.87
AGL	MKT	MANKATO MUNI	MANKATO	586035.	201835.	612.	3.32	5.23
AGL	BRD	BRAINERD-CROW WING CO/WALTER WIELAND FLD	BRAINERD	498261.	184650.	537.	2.56	4.54
AGL	AXN	CHANDLER FIELD	ALEXANDRIA	385646.	159209.	346.	2.90	3.62
AGL	OWA	OWATONNA MUNI	OWATONNA	373983.	166052.	374.	2.61	3.59
AGL	PKD	PARK RAPIDS MUNI	PARK RAPIDS	337899.	153153.	449.	1.61	3.26
AGL	FRM	FAIRMONT MUNI	FAIRMONT	311565.	156794.	317.	1.96	3.11
AGL	TVF	THIEF RIVER FALLS REGIONAL	THIEF RIVER FALLS	302662.	148123.	318.	2.01	3.00
AGL	MML	MARSHALL MUNI-RYAN FIELD	MARSHALL	291604.	153489.	331.	1.99	2.96
AGL	ILL	WILLMAR MUNI	WILLMAR	304939.	102477.	296.	1.76	2.71
AGL	EVM	EVELETH-VIRGINIA MUNI	EVELETH	308691.	76146.	312.	1.40	2.56
AGL	BDE	BAUDELETTE INTL	BAUDELETTE	273305.	84895.	262.	2.40	2.38
AGL	BJI	BEMIDJI MUNI	BEMIDJI	202343.	139028.	186.	1.37	2.27
AGL	AEL	ALBERT LEA MUNI	ALBERT LEA	191553.	109156.	166.	1.29	2.00
AGL	COQ	CLOQUET CARLTON COUNTY	CLOQUET	234487.	49715.	240.	1.06	1.89
AGL	OTG	WORTHINGTON MUNI	WORTHINGTON	168845.	104248.	159.	1.26	1.81
AGL	AUM	AUSTIN MUNI	AUSTIN	227488.	42124.	218.	1.30	1.79
AGL	ELO	ELY MUNI	ELY	168027.	98171.	165.	1.08	1.77
AGL	ULM	NEW ULM MUNI	NEW ULM	132102.	127183.	134.	1.18	1.72*
AGL	Y12	AIRLAKE INDUSTRIAL PARK	LAKEVILLE	199689.	59371.	194.	1.38*	1.72*
AGL	ROX	ROSEAU MUNI	ROSEAU	135522.	83826.	128.	0.94	1.46
AGL	BBB	BENSON MUNI	BENSON	139765.	76965.	117.	1.28	1.44
AGL	LXL	LITTLE FALLS-MORRISON COUNTY	LITTLE FALLS	159452.	45008.	191.	1.30	1.36
AGL	MLM	WINDOM MUNI	WINDOM	140481.	60064.	140.	0.90	1.33

AGL	FFM	FERGUS FALLS MUNI-EINAR MICKELSON FLD	FERGUS FALLS	55305.	123415.	0.	1.06	1.19
AGL	ONA	WINONA MUNI-MAX CONRAD FLD	WINONA	134402.	43481.	120.	1.11	1.18
AGL	MVE	MONTVIDEO-CHIPPEWA COUNTY	MONTVIDEO	141848.	24601.	137.	0.97	1.11
AGL	Y25	GATEWAY NORTH INDUSTRIAL	ANOKA	116423.	24699.	81.	0.74*	0.96*
AGL	PQN	PIPESTONE MUNI	PIPESTONE	22263.	107328.	0.	0.63	0.86
AGL	DTL	DETROIT LAKES	DETROIT LAKES	22158.	103824.	0.	0.60	0.84
AGL	MJL	JACKSON MUNI	JACKSON	101444.	17625.	98.	0.70	0.79
AGL	CKN	CROOKSTON MUNI KIRKWOOD FLD	CROOKSTON	52631.	57185.	0.	0.67	0.73
AGL	MOX	MORRIS MUNI	MORRIS	67118.	22240.	61.	0.47	0.59
AGL	Y39	OLIVIA MUNI	OLIVIA	55181.	29095.	193.	1.34	0.56
AGL	RWF	REDWOOD FALLS MUNI	REDWOOD FALLS	33231.	28701.	2.	1.23	0.41
AGL	FBL	FARIBAULT MUNI	FARIBAULT	40541.	13232.	0.	1.55	0.36
AGL	SAZ	STAPLES MUNICIPAL	STAPLES	43364.	7986.	39.	0.28	0.34
AGL	HCD	HUTCHINSON MUNI	HUTCHINSON	30610.	20918.	0.	0.34	0.34
AGL	Y33	MAPLE LAKE MUNI	MAPLE LAKE	29159.	18002.	75.	0.54	0.31
AGL	AIT	AITKIN MUNICIPAL	AITKIN	31114.	10157.	0.	0.85	0.27
AGL	GRM	DEVILS TRACK MUNI	GRAND MARAIS	32996.	5805.	31.	0.24	0.26
AGL	D31	RED WING MUNI	RED WING	25602.	12059.	0.	0.27	0.25
AGL	10D	WINSTED MUNI	WINSTED	28932.	9444.	0.	0.29	0.25
AGL	8Y6	LEADERS CLEAR LAKE	CLEAR LAKE	28513.	9307.	0.	0.28	0.25
AGL	ACQ	WASECA MUNI	WASECA	20034.	15321.	0.	0.71	0.23
AGL	8Y0	BLUE EARTH MUNI	BLUE EARTH	26270.	8575.	0.	0.26	0.23
AGL	Y63	ELBOW LAKE MUNI	ELBOW LAKE	24773.	8086.	0.	0.25	0.22
AGL	D14	FERTILE MUNI	FERTILE	20739.	12233.	0.	0.23	0.22
AGL	20Y	FLYNN'S FIELD	MONTICELLO	23479.	7664.	0.	0.23	0.21
AGL	8Y2	BUFFALO MUNI	BUFFALO	23801.	6322.	70.	0.48	0.20
AGL	14D	PRINCETON MUNI	PRINCETON	23141.	7553.	0.	0.23	0.20
AGL	D36	SKY HARBOR	DULUTH	21114.	6891.	0.	0.21	0.19
AGL	CBG	CAMBRIDGE MUNI	CAMBRIDGE	20728.	6785.	0.	0.21	0.18
AGL	64Y	WADENA MUNI	WADENA	17996.	8691.	0.	0.19	0.18
AGL	Y68	TRACY MUNI	TRACY	19407.	14644.	0.	0.14	0.17
AGL	RAD	WARROAD INTL-SWEDE CARLSON FIELD	WARROAD	8156.	17414.	0.	0.13	0.17
AGL	D19	LUVERNE MUNI	LUVERNE	10144.	13368.	0.	0.14	0.16
AGL	25D	FOREST LAKE	FOREST LAKE	17827.	5819.	0.	0.18	0.16
AGL	74Y	NORTHPORT	WHITE BEAR LAKE	18577.	6063.	0.	0.19	0.16
AGL	D33	LONGVILLE MUNI	LONGVILLE	17075.	5572.	0.	0.17	0.15
AGL	Y69	LITCHFIELD MUNI	LITCHFIELD	16763.	5471.	0.	0.16	0.15
AGL	9Y7	FOSSSTON MUNI	FOSSSTON	14781.	7319.	0.	0.16	0.15
AGL	SYN	CARLETON	STANTON	15513.	5064.	0.	0.15	0.14
AGL	14Y	TODD FIELD	LONG PRAIRIE	12731.	6650.	0.	0.14	0.13
AGL	D24	ORTONVILLE MUNI	ORTONVILLE	15250.	4978.	0.	0.15	0.13
AGL	54Y	RUSH CITY MUNI	RUSH CITY	13236.	4320.	0.	0.13	0.12
AGL	CHU	HOUSTON COUNTY	CALEDONIA	14794.	3793.	50.	0.33	0.12
AGL	1D6	HECTOR MUNI	HECTOR	12061.	3937.	0.	0.12	0.11
AGL	Y58	SLEEPY EYE MUNI	SLEEPY EYE	12762.	4166.	0.	0.13	0.11
AGL	Y29	GLENCOE MUNI	GLENCOE	12201.	3983.	0.	0.12	0.11
AGL	D81	RED LAKE FALLS MUNI	RED LAKE FALLS	12996.	4243.	0.	0.13	0.11
AGL	53D	GLENWOOD MUNI	GLENWOOD	13222.	3181.	55.	0.29	0.11
AGL	04Y	HAWLEY MUNI	HAWLEY	11008.	3593.	0.	0.11	0.10
AGL	D40	ST JAMES MUNI	ST JAMES	11144.	3638.	0.	0.11	0.10
AGL	D00	NORMAN COUNTY ADA-TWIN VALLEY	ADA - TWIN VALLEY	11448.	3737.	0.	0.11	0.10
AGL	03Y	HALLOCK MUNI	HALLOCK	6723.	7213.	0.	0.20	0.09
AGL	12Y	LE SUEUR MUNI	LE SUEUR	10373.	3386.	0.	0.10	0.09
AGL	87D	DODGE COUNTY	DODGE CENTER	11132.	2864.	37.	0.24	0.09
AGL	ORB	ORR REGIONAL	ORR	10295.	3360.	0.	0.34	0.09
AGL	DXX	DAWSON-MADISON-LAC QUI PARLE COUNTY	MADISON	9936.	3243.	0.	0.10	0.09
AGL	49Y	FILLMORE COUNTY	PRESTON	10561.	3447.	0.	0.11	0.09
AGL	D42	SPRINGFIELD MUNI	SPRINGFIELD	8912.	2909.	0.	0.09	0.08
AGL	76Y	BENSON	WHITE BEAR LAKE	8565.	2796.	0.	0.09	0.08
AGL	68Y	WELLS MUNI	WELLS	7594.	2479.	0.	0.08	0.07

AGL	19D	MORA MUNI	MORA	7914.	2583.	0.	0.08	0.07
AGL	62Y	TWO HARBORS MUNICIPAL	TWO HARBORS	6334.	2067.	0.	0.06	0.06
AGL	58Y	SILVER BAY MUNI	SILVER BAY	5256.	1716.	0.	0.05	0.05
AGL	70Y	WHEATON MUNI	WHEATON	4339.	1416.	0.	0.04	0.04
AGL	6D1	BROOKEN MUNI	BROOKEN	4552.	1486.	0.	0.05	0.04
AGL	06Y	HERMAN MUNI	HERMAN	2567.	871.	0.	0.03	0.02
AGL	6MNS	MAHNMEN COUNTY	MAHNMEN	2590.	845.	0.	0.03	0.02
AGL	JMS	JAMESTOWN MUNI	JAMESTOWN	509805.	186818.	525.	3.41	6.63
AGL	DVL	DEVILS LAKE MUNI	DEVILS LAKE	384053.	145141.	457.	3.17	3.52
AGL	DIK	DICKINSON MUNICIPAL	DICKINSON	139674.	92378.	144.	1.24	1.54
AGL	D04	BOWMAN MUNICIPAL	BOWMAN	50891.	111271.	0.	0.38	1.08
AGL	RUG	RUGBY MUNI	RUGBY	47066.	14769.	37.	0.43	0.41
AGL	Y19	MANDAN MUNI	MANDAN	23697.	20795.	0.	0.29	0.30
AGL	GAF	GRAFTON MUNI	GRAFTON	22107.	20923.	0.	0.27	0.29
AGL	6D8	BARNES COUNTY MUNICIPAL	VALLEY CITY	25935.	13588.	0.	0.28	0.26
AGL	HEI	HETTINGER MUNICIPAL	HETTINGER	16180.	11077.	0.	0.20	0.22
AGL	D63	BRECKENRIDGE-WAHPETON INTERSTATE	WAPPETON	18242.	11077.	0.	0.21	0.19
AGL	D60	TIOGA MUNI	TIOGA	16367.	10466.	0.	0.19	0.18
AGL	D09	BOTTINEAU MUNI	BOTTINEAU	8969.	15927.	0.	0.14	0.17
AGL	D55	LANGDON MUNI	LANGDON	15877.	10305.	0.	0.18	0.17
AGL	D6D	ROLLA MUNI	ROLLA	8969.	13359.	0.	0.13	0.15
AGL	ND34	LISBON MUNI	LISBON	17452.	5697.	0.	0.18	0.15
AGL	3ND0	VINCE	NORTHWOOD	16180.	5281.	0.	0.16	0.14
AGL	ND31	LARIMORE MUNI	LARIMORE	16180.	5281.	0.	0.16	0.14
AGL	IND3	HARMY FIELD	KINDRED	14577.	4758.	0.	0.15	0.13
AGL	08D	STANLEY MUNI	STANLEY	8969.	10739.	0.	0.12	0.13
AGL	Y36	MOHALL MUNI	MOHALL	14300.	4668.	0.	0.15	0.13
AGL	PMB	PEMBINA MUNI	PEMBINA	10546.	8565.	0.	0.13	0.13
AGL	ND44	MOTT MUNICIPAL	MOTT	14300.	4668.	0.	0.15	0.13
AGL	S32	COOPERSTOWN MUNI	COOPERSTOWN	13214.	4313.	0.	0.14	0.12
AGL	D50	CROSBY MUNI	CROSBY	13214.	4313.	0.	0.14	0.12
AGL	05D	NEW TOWN MUNI	NEW TOWN	5815.	12329.	0.	0.10	0.12
AGL	ND59	ST THOMAS MUNI	ST THOMAS	12251.	4000.	0.	0.12	0.11
AGL	96D	WALHALLA MUNI	WALHALLA	12120.	3957.	0.	0.12	0.11
AGL	D57	GLEN ULLIN MUNI	GLEN ULLIN	11146.	3638.	0.	0.10	0.10
AGL	ND06	CAVALIER MUNI	CAVALIER	9756.	3185.	0.	0.10	0.09
AGL	S25	WATFORD CITY MUNI	WATFORD CITY	10059.	3283.	0.	0.10	0.09
AGL	D56	MAYVILLE MUNI	MAYVILLE	9133.	2982.	0.	0.09	0.08
AGL	Y37	PARK RIVER MUNI	PARK RIVER	8607.	2810.	0.	0.09	0.08
AGL	Y74	HANKINS FIELD	PARSHALL	7926.	2587.	0.	0.08	0.07
AGL	S28	INTERNATIONAL PEACE GARDEN	DUNSEITH	7994.	2609.	0.	0.08	0.07
AGL	ND12	ELLENDALE MUNI	ELLENDALE	6871.	2243.	0.	0.07	0.06
AGL	ND49	OAKES MUNICIPAL	OAKES	5927.	1935.	0.	0.06	0.05
AGL	ASY	ASHLEY MUNI	ASHLEY	5814.	1898.	0.	0.06	0.05
AGL	20U	BEACH	BEACH	4555.	1487.	0.	0.05	0.04
AGL	D64	WESTHOPE MUNI	WESTHOPE	4238.	1383.	0.	0.04	0.04
AGL	90Y	LEONARD MUNICIPAL	LEONARD	1778.	580.	0.	0.02	0.02
AGL	22G	LORAIN COUNTY REGIONAL	LORAIN/ELYRIA/	1847813.	416113.	1898.	10.60	15.04
AGL	MGY	DAYTON GENERAL ARPT SOUTH	DAYTON	1533983.	353604.	1633.	7.54	12.54
AGL	HA0	HAMILTON AIRPORT	HAMILTON	914329.	263137.	909.	6.23*	7.82*
AGL	214	BOLTON FLD	COLUMBUS	831125.	247558.	927.	5.44*	7.17*
AGL	LNN	LOST NATION	WILLOUGHBY	741814.	183543.	721.	4.88*	6.15*
AGL	MW0	HOOK FIELD MUNI	MIDDLETOWN	700924.	219733.	738.	4.31	6.02
AGL	MNN	MARION MUNI	MARION	696627.	209299.	727.	3.88	6.12
AGL	SG7	BLUFFTON	BLUFFTON	657383.	152361.	632.	3.38	5.38
AGL	1G3	ANDREW W PATON OF KENT STATE UNIV	KENT	570555.	204952.	489.	3.95*	5.15*
AGL	A0H	ALLEN COUNTY	LIMA	567656.	203933.	562.	3.14	5.13
AGL	PHD	HARRY CLEVER FIELD	NEW PHILADELPHIA	556437.	190945.	550.	3.91*	4.97*

I19	AGL	GREENE COUNTY		XENIA	OH	325331.	165270.	529.	3.03	4.59
7G2	AGL	ASHTABULA COUNTY		ASHTABULA	OH	470970.	127304.	497.	2.65	3.98
14G	AGL	PROGRESS FIELD		FREMONT	OH	453845.	129132.	464.	3.37	3.87
I77	AGL	CINCINNATI-BLUE ASH		CINCINNATI	OH	438446.	110033.	443.	2.24	3.64
02G	AGL	COLUMBIANA COUNTY		EAST LIVERPOOL	OH	430110.	113303.	414.	2.02	3.61
G0Q	AGL	GALION MUNI		GALION	OH	367903.	173837.	335.	2.37	3.60
TDZ	AGL	MEYCALF FIELD		TOLEDO	OH	382623.	152559.	310.	3.14	3.56
FDY	AGL	FINDLAY		FINDLAY	OH	372240.	93812.	383.	1.96	3.10
I15	AGL	FAIRFIELD COUNTY		LANCASTER	OH	308698.	158290.	237.	2.40*	3.10*
I67	AGL	HARRISON		HARRISON	OH	341742.	62577.	345.	2.45*	2.69*
Z2V	AGL	ZANESVILLE MUNI		ZANESVILLE	OH	297361.	101900.	295.	2.00	2.65
USE	AGL	FULTON COUNTY		WAUSEON	OH	323121.	73356.	327.	2.09	2.63
I69	AGL	CLERMONT COUNTY		BATAVIA	OH	253676.	99921.	228.	1.76*	2.35*
3G4	AGL	ASHLAND COUNTY		ASHLAND	OH	273536.	70996.	288.	1.20	2.29
I6G	AGL	SENECA COUNTY		TIFFIN	OH	237402.	103530.	0.	0.77	2.27
2G1	AGL	CONCORD AIRPARK		PAINESVILLE	OH	278077.	50950.	266.	1.72*	2.19*
I7G	AGL	PORT BUCYRUS-CRAWFORD COUNTY		BUCYRUS	OH	220987.	90048.	210.	1.54*	2.07*
SKY	AGL	GRIFFING SANDUSKY		SANDUSKY	OH	147984.	140344.	86.	1.67	1.92
4I3	AGL	KNOX COUNTY		MOUNT VERNON	OH	163721.	122112.	165.	1.39*	1.90*
I12	AGL	SIDNEY		SIDNEY	OH	212256.	60434.	220.	1.05	1.81
T50	AGL	CARROLL COUNTY-TOLSON		CARROLLTON	OH	220993.	50966.	203.	1.45	1.81
4G3	AGL	GREAT LAKES AERO-PORT		ALLIANCE	OH	214979.	50786.	191.	1.37*	1.77*
I23	AGL	FAYETTE COUNTY		WASHINGTON COURT HOUSE	OH	212567.	53699.	200.	1.29	1.77
DFI	AGL	DEFIANCE MEML		DEFIANCE	OH	137859.	126948.	138.	1.19	1.76
I17	AGL	PIQUA		PIQUA	OH	211508.	45697.	220.	1.50	1.71
UNI	AGL	OHIO UNIVERSITY		ATHENS/ALBANY	OH	174817.	81050.	170.	1.21	1.70
I65	AGL	FREEDOM FIELD		MEDINA	OH	143321.	107174.	0.	1.70	1.66
0G6	AGL	WILLIAMS COUNTY		BRYAN	OH	139941.	102362.	139.	1.15*	1.61*
DLZ	AGL	DELAWARE MUNI		DELAWARE	OH	106887.	131079.	0.	1.45	1.58
I5G	AGL	WELTZIEN SKYPARK		WADSWORTH	OH	141922.	61374.	0.	1.53	1.35
I60	AGL	WOOD COUNTY		BOWLING GREEN	OH	157792.	42722.	159.	0.83	1.33
I78	AGL	UNION COUNTY		MARYSVILLE	OH	158380.	40834.	153.	1.07	1.32
3G6	AGL	TRI-CITY		SEBRING	OH	118277.	69776.	124.	0.59	1.25
OXD	AGL	MIAMI UNIVERSITY		OXFORD	OH	140750.	42451.	141.	0.68	1.22
4I2	AGL	SOUTH COLUMBUS		COLUMBUS	OH	94690.	83209.	0.	1.17	1.18
2I8	AGL	NEWARK-HEATH		NEWARK	OH	103248.	71465.	1.	3.25	1.16
GAS	AGL	GALLIA-MEIGS REGIONAL		GALLIPOLIS	OH	49949.	121669.	0.	1.02	1.14
OH17	AGL	HENRY COUNTY		NAPOLEON	OH	82755.	86276.	72.	0.77*	1.12*
PCW	AGL	CARL R KELLER FIELD		PORT CLINTON	OH	46954.	120688.	0.	0.98	1.11
UYF	AGL	MADISON COUNTY		LONDON	OH	66615.	97586.	204.	1.60	1.09
06G	AGL	YOUNGSTOWN EXECUTIVE		YOUNGSTOWN	OH	42970.	119390.	0.	1.63	1.08
I40	AGL	RICHARD DOWNING		COSHOCOTN	OH	125387.	37593.	119.	0.84*	1.08*
6G5	AGL	BARNESVILLE-BRADFIELD		BARNESVILLE	OH	137219.	23188.	140.	0.67	1.07
I68	AGL	LEBANON-WARREN COUNTY		LEBANON	OH	127557.	30647.	120.	0.81*	1.05*
H0C	AGL	HIGHLAND COUNTY		HILLSBORO	OH	115318.	41919.	108.	0.96	1.04
PMH	AGL	GREATER PORTSMOUTH REGIONAL		PORTSMOUTH	OH	46419.	109061.	1.	1.62	1.03
04G	AGL	LANDSOWNE		YOUNGSTOWN	OH	129460.	23724.	129.	0.86*	1.02*
I54	AGL	MAD RIVER INC.		TREMONT CITY	OH	33090.	116166.	0.	0.84	0.99
7I7	AGL	BELLEFONTAINE MUNI		BELLEFONTAINE	OH	116942.	30252.	117.	0.74	0.98
VNW	AGL	VAN WERT MUNI		VAN WERT	OH	112144.	35814.	107.	0.67	0.98
AXV	AGL	NEIL ARMSTRONG		WAPAKONETA	OH	123566.	21270.	124.	0.84*	0.96*
29G	AGL	PORTAGE COUNTY		RAVENNA	OH	88342.	56799.	80.	0.69*	0.96*
CY0	AGL	PICKAWAY COUNTY MEMORIAL		CIRCLEVILLE	OH	98026.	39999.	95.	0.65	0.92
2G2	AGL	STEUBENVILLE PIER		STEUBENVILLE	OH	74121.	59346.	0.	0.89	0.89
89D	AGL	KELLEYS ISLAND LAND FLD		KELLEYS ISLAND	OH	26673.	102749.	0.	0.64	0.86
56D	AGL	MYANDOT COUNTY		UPPER SANDUSKY	OH	66586.	54780.	102.	1.08	0.81
7G8	AGL	GEAUGA COUNTY		MIDDLEFIELD	OH	74775.	39605.	65.	0.56*	0.76*
3I7	AGL	MYERS		PHILLIPSBURG	OH	88808.	24365.	47.	0.65	0.75
8G1	AGL	WILLARD		WILLARD	OH	43314.	69303.	34.	0.50*	0.75*
C9A	AGL	LAKEFIELD		CELINA	OH	90589.	22088.	84.	0.68	0.75

AGL	BJJ	WAYNE COUNTY	WOOSTER	66365.	45187.	43.	0.60*	0.74*
AGL	3DS	BORDNER AIRSTRIP	BOWLING GREEN	65749.	44860.	0.	0.73	0.73
AGL	1G1	ELYRIA	ELYRIA	84869.	24910.	83.	0.57*	0.73*
AGL	173	MORAIN AIR PARK	DAYTON	80064.	26135.	0.	0.83	0.71
AGL	OH30	PUT IN BAY	PUT IN BAY	9979.	91169.	0.	0.43	0.67
AGL	319	BUCKEYE VALLEY	HEBRON	63051.	27629.	62.	0.47*	0.64*
AGL	OH21	HURON COUNTY-CITY OF NORWALK	NORWALK	15362.	80414.	0.	0.43	0.64
AGL	62D	WARREN	WARREN	53335.	38229.	35.	0.47*	0.61*
AGL	1G6	STRONGSVILLE	STRONGSVILLE	67482.	22028.	0.	0.70	0.59
AGL	10G	HOLMES COUNTY	MILLERSBURG	60667.	21489.	55.	0.39	0.55
AGL	4G4	YOUNGSTOWN ELSEY METRO	NORTH LIMA	66390.	12201.	62.	0.41*	0.52*
AGL	371	TROY SKYPARK	TROY	65978.	12995.	64.	0.41*	0.52*
AGL	12G	SHELBY COMMUNITY	SHELBY	60728.	15765.	58.	0.39*	0.51*
AGL	PV2	CASEMENT	PAINESVILLE	58787.	10405.	57.	0.37*	0.46*
AGL	144	DAHIO	DAYTON	28293.	36181.	0.	0.38	0.43
AGL	OH14	WOODRUFF	MONTPELIER	41691.	18578.	0.	0.45	0.40
AGL	CDI	CAMBRIDGE MUNI	CAMBRIDGE	14795.	45061.	0.	0.55	0.40
AGL	310	RIVERSIDE	ZANESVILLE	44403.	14495.	0.	0.44	0.39
AGL	7D5	PRIEBE	FINDLAY	18497.	38371.	0.	0.30	0.38
AGL	I62	BROOKVILLE AIR-PARK	BROOKVILLE	39531.	18295.	0.	0.42	0.38
AGL	FZ1	FOSTORIA METROPOLITAN	FOSTORIA	26983.	26724.	85.	0.61	0.36
AGL	AMT	ALEXANDER SALAMON	WEST UNION	18469.	35182.	0.	0.31	0.36
AGL	R2T	ROSS COUNTY	CHILLICOTHE	27504.	23470.	0.	0.34	0.34
AGL	8G6	HARRISON COUNTY	CADIZ	24968.	24187.	78.	0.46	0.33
AGL	I10	NOBLE COUNTY AIRPARK	CALDWELL	17058.	31706.	0.	0.27	0.32
AGL	VES	DARKE COUNTY	VERSAILLES	37270.	11093.	130.	0.69	0.32
AGL	3G3	WADSWORTH MUNI	WADSWORTH	31106.	15451.	0.	0.34	0.31
AGL	I74	GRIMES FIELD	URBANA	31398.	12786.	0.	0.33	0.29
AGL	GEO	BROWN COUNTY	GEORGETOWN	10231.	31581.	0.	0.23	0.28
AGL	OWX	PUTNAM COUNTY	OTTAWA	25963.	15215.	0.	0.28	0.27
AGL	4G8	COLUMBIA	COLUMBIA STATION	27818.	9081.	0.	0.20	0.25
AGL	OH23	BLATTER	ORRVILLE	12354.	24148.	0.	0.20	0.24
AGL	I43	JAMES A RHODES	JACKSON	15116.	19680.	45.	0.35	0.23
AGL	HTW	LAURENCE COUNTY AIRPARK	CHEESAPEAKE/HUNTINGTON	16133.	17942.	0.	0.21	0.23
AGL	4D6	CHARDON	CHARDON	24779.	8089.	0.	0.25	0.22
AGL	2D7	BEACH CITY	BEACH CITY	25152.	8212.	0.	0.25	0.22
AGL	5D4	MARTIN FIELD	CANTON	14109.	15383.	0.	0.18	0.20
AGL	041	COLUMBUS SOUTHWEST	COLUMBUS	22919.	7482.	0.	0.23	0.20
AGL	OH20	NORTHFIELD	NORTHFIELD	22324.	7288.	0.	0.22	0.20
AGL	221	VINTON COUNTY	MCARTHUR	10874.	16212.	0.	0.16	0.18
AGL	091	DELPHOS	DELPHOS	19094.	6234.	0.	0.19	0.17
AGL	191	BROWNIES LEBANON	LEBANON	9163.	14203.	0.	0.13	0.16
AGL	1G8	DYER	TORONTO	18335.	5983.	0.	0.18	0.16
AGL	I66	CLINTON FIELD	WILMINGTON	9201.	13065.	0.	0.13	0.15
AGL	I71	MORGAN COUNTY	MCCONNELLSVILLE	5381.	16708.	0.	0.11	0.15
AGL	421	PARR	ZANESVILLE	13001.	9419.	0.	0.15	0.15
AGL	I57	PIKE COUNTY	WAVERLY	8491.	12859.	0.	0.12	0.14
AGL	I95	HARDIN COUNTY	KENTON	15612.	5096.	0.	0.16	0.14
AGL	OH3	ALDERMAN	ST CLAIRSVILLE	15113.	4933.	0.	0.15	0.13
AGL	88D	HURON	HURON	9203.	8393.	0.	0.11	0.12
AGL	401	WAYNESVILLE	WAYNESVILLE	13004.	4245.	0.	0.13	0.11
AGL	67D	BOTSFORD	WELLINGTON	11945.	4439.	0.	0.12	0.11
AGL	4G5	MONROE COUNTY	WOODSFIELD	6789.	8250.	0.	0.09	0.10
AGL	I70	ONERLIN	ONERLIN	10715.	3498.	0.	0.11	0.09
AGL	38D	SALEM AIRPARK INC	SALEM	10222.	3327.	0.	0.10	0.09
AGL	I51	TYLER	ADERDEEN	4877.	6981.	0.	0.07	0.08
AGL	419	MORROW COUNTY	MT GILEAD	9229.	3013.	0.	0.10	0.08
AGL	2D1	BARBER	ALLIANCE	8963.	2926.	0.	0.09	0.08
AGL	I86	PERRY COUNTY	NEW LEXINGTON	7694.	2511.	0.	0.08	0.07
AGL	6G4	WYNKOOP	MT VERNON	6524.	2770.	0.	0.07	0.06

AGL	OH15	MINERVA	MINERVA	OH	7258.	2370.	0.	0.07	0.06
AGL	OH07	SUNSET STRIP	MARLBORO	OH	5984.	1953.	0.	0.06	0.05
AGL	6D2	ASHTABULA CONNEAUT	CONNEAUT	OH	5051.	1649.	0.	0.05	0.04
AGL	52D	TIFFIN	TIFFIN	OH	4322.	1411.	0.	0.04	0.04
AGL	OH09	CRAFT	MIDDLE BASS ISLAND	OH	2606.	2062.	0.	0.03	0.03
AGL	111	CRAFT	FREDERICKTOWN	OH	1977.	1940.	0.	0.02	0.03
AGL	ILN	WILMINGTON INDUSTRIAL AIRPARK	WILMINGTON	OH	3178.	1037.	0.	0.03	0.03
AGL	7D6	LIBERTY AIRPARK	FREEDOM	OH	2800.	914.	0.	0.03	0.02
AGL	808	KOONS	SALEM	OH	2273.	742.	0.	0.02	0.02
AGL	OH06	MILLS	MAINTUA	OH	2757.	900.	0.	0.03	0.02
AGL	OH36	MILLER FARM LANDING STRIP	BALTIMORE	OH	1621.	529.	0.	0.02	0.01
AGL	63D	GRIESER	HAUSEON	OH	1239.	404.	0.	0.01	0.01
AGL	PIR	PIERRE MUNI	PIERRE	SD	857207.	244522.	930.	4.88	7.32
AGL	ATY	WATERTOWN MUNI	WATERTOWN	SD	800879.	235666.	844.	4.48	6.89
AGL	MHE	MITCHELL MUNI	MITCHELL	SD	524431.	195118.	521.	3.99	4.78
AGL	YKN	CHAN GURNEY MUNI	YANKTON	SD	425559.	177124.	440.	3.19	4.00
AGL	BKX	BROOKINGS MUNI	BROOKINGS	SD	392459.	172452.	402.	3.15	3.75
AGL	Y14	SKY HAVEN AIRPARK	SIoux FALLS	SD	355538.	74843.	345.	2.26*	2.86*
AGL	SPF	BLACK HILLS	SPEARFISH	SD	42932.	34796.	0.	0.51	0.52
AGL	LEM	LEMMON MUNI	LEMMON	SD	49602.	23952.	0.	0.54	0.49
AGL	PHP	PHILIP	PHILIP	SD	42562.	24336.	0.	1.58	0.44
AGL	3VM	HAROLD DAVIDSON FIELD	VERMILLION	SD	42437.	17798.	0.	0.45	0.40
AGL	MDS	MADISON MUNI	MADISON	SD	32949.	26305.	0.	0.39	0.39
AGL	66D	STURGIS MUNI	STURGIS	SD	44055.	14380.	0.	0.45	0.39
AGL	MBG	MOBRIDGE MUNI	MOBRIDGE	SD	33768.	25317.	0.	0.40	0.39
AGL	SD39	808 WILEY FIELD	WINNER	SD	28366.	24972.	0.	0.35	0.36
AGL	3BF	BUS FIELD	BELLE FOURCHE	SD	23678.	28512.	0.	0.32	0.35
AGL	HSR	HOT SPRINGS MUNI	HOT SPRINGS	SD	33393.	16028.	0.	0.36	0.33
AGL	CHB	CHAMBERLAIN MUNI	CHAMBERLAIN	SD	37950.	12386.	0.	0.39	0.33
AGL	AGZ	WAGNER MUNI	WAGNER	SD	34941.	11404.	0.	0.35	0.33
AGL	0D8	GETTYSBURG MUNI	GETTYSBURG	SD	33836.	11044.	0.	0.35	0.33
AGL	8D7	CLARK COUNTY	CLARK	SD	32187.	10506.	0.	0.33	0.28
AGL	3FU	FAULKTON MUNI	FAULKTON	SD	28799.	9400.	0.	0.29	0.25
AGL	3BT	BRITTON MUNI	BRITTON	SD	27292.	8908.	0.	0.28	0.24
AGL	1D8	REDFIELD MUNI	REDFIELD	SD	27595.	9007.	0.	0.28	0.24
AGL	1D0	MILLER MUNI	MILLER	SD	22358.	7297.	0.	0.23	0.20
AGL	8D3	SISSETON MUNI	SISSETON	SD	19282.	8861.	0.	0.21	0.19
AGL	1D1	MILBANK MUNI	MILBANK	SD	15786.	7721.	0.	0.17	0.16
AGL	9D1	GREGORY MUNI	GREGORY	SD	10033.	13719.	0.	0.14	0.16
AGL	SD34	PRESHO MUNI	PRESHO	SD	16049.	5239.	0.	0.16	0.14
AGL	1D7	WEBSTER MUNI	WEBSTER	SD	11135.	3635.	0.	0.11	0.10
AGL	9V6	MARTIN MUNI	MARTIN	SD	10033.	3275.	0.	0.10	0.09
AGL	6V4	WALL MUNI	WALL	SD	4010.	6437.	0.	0.06	0.07
AGL	98D	ONIDA MUNI	ONIDA	SD	7894.	2577.	0.	0.08	0.07
AGL	SD33	PARKSTON MUNI	PARKSTON	SD	7426.	2975.	0.	0.08	0.07
AGL	5V8	KADOKA MUNI	KADOKA	SD	7025.	2293.	0.	0.07	0.06
AGL	9D2	HARDING COUNTY	BUFFALO	SD	6351.	2073.	0.	0.06	0.06
AGL	6V0	EDGEMONT MUNI	EDGEMONT	SD	5262.	1718.	0.	0.05	0.05
AGL	6V2	PINE RIDGE	PINE RIDGE	SD	4075.	1330.	0.	0.04	0.04
AGL	1D3	PLATTE MUNI	PLATTE	SD	3950.	1289.	0.	0.04	0.03
AGL	SD10	CANTON MUNI	CANTON	SD	2406.	785.	0.	0.02	0.02
AGL	8D9	HOWARD MUNI	HOWARD	SD	2270.	741.	0.	0.02	0.02
AGL	ENW	KENOSHA MUNI	KENOSHA	WI	1363976.	333945.	1406.	7.50	11.28
AGL	UES	WAUKESHA COUNTY	WAUKESHA	WI	1006748.	193139.	1008.	6.56*	7.97*
AGL	ETB	WEST BEND MUNI	WEST BEND	WI	820071.	241427.	780.	6.72	7.05
AGL	EAU	EAU CLAIRE COUNTY	EAU CLAIRE	WI	824663.	236967.	896.	3.99	7.05
AGL	SBM	SHEBOYGAN COUNTY MEMORIAL	SHEBOYGAN	WI	733198.	204078.	819.	4.22	6.23
AGL	ISW	ALEXANDER FIELD SOUTH WOOD COUNTY	WISCONSIN RAPIDS	WI	444000.	180604.	454.	2.94	4.15

AGL	FLD	FOND DU LAC COUNTY	FOND DU LAC	WI	432471.	175493.	437.	2.82	4.04
AGL C29	MOREY		MADISON	WI	447021.	150978.	442.	3.10*	3.97*
AGL RHI	RHINELANDER-ONEIDA COUNTY		RHINELANDER	WI	420208.	174821.	442.	2.76	3.95
AGL MFI	MARSHFIELD MUNI		MARSHFIELD	WI	391060.	167033.	436.	2.16	3.71
AGL ASX	JOHN F KENNEDY MEMORIAL		ASHLAND	WI	382527.	166727.	529.	2.14	3.65
AGL C31	HARTFORD MUNI		HARTFORD	WI	434200.	111628.	434.	2.76	3.63
AGL C52	BURLINGTON MUNI		BURLINGTON	WI	428546.	86353.	444.	2.30	3.42
AGL MTW	MANITOWOC COUNTY		MANITOWOC	WI	349351.	161872.	375.	2.15	3.40
AGL CWA	CENTRAL WISCONSIN		MOSTINEE	WI	333487.	160461.	321.	1.98	3.28
AGL STE	STEVENS POINT MUNI		STEVENS POINT	WI	319200.	143431.	318.	2.41	3.07
AGL HYR	HAYWARD MUNI		HAYWARD	WI	295309.	152135.	452.	2.21	2.97
AGL AUW	WAUSAU MUNI		WAUSAU	WI	289221.	152221.	284.	2.21*	2.95*
AGL C02	PLAYBOY		LAKE GENEVA	WI	222649.	131662.	234.	2.06	2.40
AGL 44C	BELOIT		BELOIT	WI	222649.	125224.	221.	1.72*	2.31*
AGL SUW	RICHARD I BONG		SUPERIOR	WI	280427.	61663.	290.	1.62	2.27
AGL ARV	LAKELAND		MINOCQUA/WOODRUFF	WI	219920.	96897.	218.	1.61	2.11
AGL RAC	HORLICK-RACINE		RACINE	WI	223634.	86551.	237.	1.81	2.09
AGL UNU	DODGE COUNTY		JUNEAU	WI	228978.	44391.	229.	1.42	1.82
AGL RIE	RICE LAKE MUNICIPAL		RICE LAKE	WI	179485.	90168.	262.	1.24	1.79
AGL CLI	CLINTONVILLE MUNI		CLINTONVILLE	WI	115746.	143137.	0.	5.97	1.72
AGL C47	PORTAGE MUNI		PORTAGE	WI	188320.	62167.	186.	1.33*	1.66*
AGL 3CU	CABLE UNION		CABLE	WI	131944.	115176.	135.	1.29*	1.64*
AGL EGV	EAGLE RIVER MUNI		EAGLE RIVER	WI	129899.	72315.	123.	1.35	1.34
AGL C46	PLATTEVILLE		PLATTEVILLE	WI	160026.	34158.	147.	0.97*	1.29*
AGL 92C	CARTER		PULASKI	WI	152817.	31728.	161.	1.05*	1.29*
AGL AIG	LANGLADE COUNTY		ANTIGO	WI	63551.	122116.	194.	2.34	1.23
AGL RRL	MERRILL MUNI		MERRILL	WI	122036.	57589.	109.	1.10	1.19
AGL Y35	BLACK RIVER FALLS AREA		BLACK RIVER FALLS	WI	135632.	32991.	136.	0.95*	1.12*
AGL PVB	GRANT COUNTY		PLATTEVILLE	WI	122753.	38198.	122.	0.79	1.07
AGL C85	BARABOO WISCONSIN DELLS		BARABOO	WI	111517.	43409.	113.	0.90*	1.03*
AGL 93C	RICHLAND		RICHLAND CENTER	WI	116725.	27455.	117.	0.79*	0.96*
AGL W107	WAUPUN		WAUPUN	WI	44000.	87687.	0.	0.73	0.87
AGL DEO	OSCEOLA MUNI		OSCEOLA	WI	108432.	23005.	96.	0.83	0.87
AGL PDC	RAIRIE DU CHIEN MUNI		RAIRIE DU CHIEN	WI	102154.	26803.	104.	0.59	0.86
AGL RYV	WATERTOWN MUNI		WATERTOWN	WI	70851.	50584.	0.	0.80	0.81
AGL LNL	KINGS LAND O' LAKES		LAND O' LAKES	WI	94884.	26062.	96.	0.81	0.80
AGL C32	IOWA COUNTY		MINERAL POINT	WI	95423.	21474.	94.	0.63*	0.78*
AGL LNR	TRI-COUNTY		LONE ROCK	WI	87034.	27356.	86.	0.61*	0.76*
AGL PCZ	WAUPACA MUNI		WAUPACA	WI	42018.	62595.	0.	0.61	0.70
AGL 57C	EAST TROY MUNI		EAST TROY	WI	33613.	57408.	0.	0.52	0.60
AGL 91C	SAUK-RAIRIE		RAIRIE DU SAC	WI	23159.	56042.	0.	0.42	0.53
AGL 3W0	SHAWANO MUNI		SHAWANO	WI	31920.	47142.	0.	0.47	0.53
AGL SUE	DOOR COUNTY CHERRYLAND		STURGEON BAY	WI	23189.	56429.	1.	1.10	0.53
AGL D28	RUSK COUNTY		L.DYSMITH	WI	22023.	56071.	0.	0.41	0.52
AGL W112	AMERY MUNI		AMERY	WI	30086.	47818.	0.	0.45	0.52
AGL 79C	BRENNAND		NEENAH	WI	48324.	26757.	158.	0.52	0.50
AGL SSQ	SHELL LAKE MUNI		SHELL LAKE	WI	44277.	27663.	0.	1.18	0.48
AGL 02C	CAPITOL DRIVE		PEWAUKEE	WI	52196.	17037.	0.	0.54	0.46
AGL Y78	RAINBOW		FRANKLIN	WI	39012.	26470.	0.	0.44	0.44
AGL MDZ	TAYLOR COUNTY		MEDFORD	WI	18751.	45112.	1.	0.77	0.42
AGL W110	WESTTOSHA		WILMOT	WI	44048.	14376.	0.	0.44	0.39
AGL 81C	NEILLSVILLE MUNI		NEILLSVILLE	WI	22527.	35469.	0.	0.33	0.39
AGL D27	PRICE COUNTY		PHILLIPS	WI	15312.	44009.	0.	0.30	0.35
AGL RNH	NEW RICHMOND MUNI		NEW RICHMOND	WI	26828.	25231.	0.	0.32	0.35
AGL C33	MONROE MUNI		MONROE	WI	28837.	23947.	0.	0.35	0.35
AGL C59	LAKE LAWN		DELAVER	WI	27059.	25305.	0.	0.32	0.35
AGL C89	SYLVANIA		STURTEVANT	WI	28838.	24124.	0.	0.35	0.35
AGL Y52	BURNETT COUNTY		SIREN	WI	28609.	18851.	0.	0.33	0.32
AGL 8D1	NEW HOLSTEIN MUNI		NEW HOLSTEIN	WI	25706.	23101.	0.	0.32	0.32
AGL 88C	PALMYRA MUNI		PALMYRA	WI	29907.	17025.	0.	0.34	0.31

AGL 76C	AERO PARK	WI	33036.	10782.	0.	0.33	0.29
AGL 47C	BOSCOBEL	WI	26513.	15899.	58.	0.50	0.28
AGL 73C	LANCASTER MUNICIPAL	WI	15108.	24449.	0.	0.23	0.26
AGL OCQ	OCNTO MUNI	WI	18012.	20589.	0.	0.24	0.26
AGL PKF	PARK FALLS MUNI	WI	15241.	24564.	0.	0.23	0.26
AGL D25	MANITOWISH WATERS	WI	12910.	23803.	0.	0.21	0.24
AGL WI06	WAUNAKEE	WI	20260.	14358.	0.	0.23	0.23
AGL 58C	TOBACCO CITY	WI	19992.	12892.	0.	0.23	0.22
AGL C35	REEDSBURG MUNI	WI	21026.	11697.	0.	0.75	0.22
AGL Y50	MAUTOMA MUNI	WI	21933.	10777.	0.	0.24	0.22
AGL C69	GONSTEAD	WI	15101.	10421.	0.	0.17	0.17
AGL 96C	FOX RIVER	WI	18122.	5915.	0.	0.18	0.16
AGL WI15	BARRON MUNI	WI	13214.	7066.	0.	0.14	0.13
AGL D74	SPARTA MUNI	WI	13460.	4393.	0.	0.13	0.12
AGL GTG	GRANTSBURG MUNI	WI	6525.	12183.	0.	0.10	0.12
AGL C37	BRODHEAD	WI	12081.	5045.	0.	0.12	0.11
AGL Y23	CHETEK MUNI-SOUTHWORTH	WI	9061.	5711.	0.	0.10	0.10
AGL C76	LODI LAKELAND	WI	10959.	4678.	0.	0.11	0.10
AGL 94C	COWGILL FIELD	WI	9892.	3229.	0.	0.10	0.09
AGL 61C	FORT ATKINSON MUNI	WI	10697.	3492.	0.	0.11	0.09
AGL Y72	BLOYER FIELD	WI	10070.	3287.	0.	0.10	0.09
AGL WI05	BIG FOOT AIRFIELD	WI	7475.	6565.	0.	0.09	0.09
AGL 52C	FLYING HOOF	WI	3020.	6477.	0.	0.05	0.06
AGL 82C	MAUSTON-NEW LISBON UNION	WI	5409.	4199.	0.	0.06	0.06
AGL 3D2	EPHRAIM-FISH CREEK	WI	4200.	3805.	0.	0.05	0.05
AGL 64C	VINCENT	WI	6041.	1972.	0.	0.05	0.05
AGL 50C	GROB	WI	4656.	1520.	0.	0.05	0.04
AGL 63C	ADAMS COUNTY LEGION FIELD	WI	4828.	1576.	0.	0.05	0.04
AGL 62C	HUNT FIELD	WI	4996.	1631.	0.	0.05	0.04
AGL Y55	CRANDON MUNI	WI	2948.	3396.	0.	0.04	0.04
AGL WI04	VERONA	WI	4405.	1438.	0.	0.04	0.04

NEW ENGLAND REGION

ANE OXC	WATERBURY-OXFORD	CT	1074489.	295102.	1053.	5.15	9.10
ANE N04	GRISWOLD	CT	197278.	139502.	195.	1.68*	2.24*
ANE 5B3	DANIELSON	CT	253545.	59483.	249.	1.66*	2.08*
ANE MMK	MERIDEN MARKHAM MUNI	CT	113840.	133709.	383.	2.90	1.64
ANE 488	ROBERTSON FIELD	CT	81970.	106584.	0.	1.14	1.25
ANE 788	NEW LONDON-WATERFORD	CT	58289.	124389.	0.	1.08	1.21
ANE 580	WINDHAM	CT	117141.	30006.	400.	2.60	0.98
ANE 489	SIMSBURY TRI-TOWN	CT	28838.	103269.	0.	0.66	0.88
ANE 22B	JOHNNYCAKE	CT	40673.	28304.	0.	0.48	0.46
ANE 789	ELLINGTON	CT	38279.	12495.	0.	0.38	0.34
ANE 786	SKYLARK AIRPARK	CT	16536.	12858.	0.	0.20	0.20
ANE 0N0	ANSONIA	CT	1914.	625.	0.	0.02	0.02
ANE 6B6	MINUTE MAN AIRFIELD	MA	1330966.	254029.	1346.	9.71*	10.53*
ANE TAN	TAUNTON MUNI	MA	666084.	146678.	655.	3.61	5.40
ANE FIT	FITCHBURG	MA	607458.	202435.	583.	4.80*	5.38*
ANE B09	TEW-MAC	MA	561909.	149490.	607.	3.62	4.73
ANE 3B2	MARSHFIELD	MA	398501.	149973.	382.	2.79*	3.64*
ANE PVC	PROVINCETOWN MUNI	MA	342121.	163012.	346.	3.13*	3.36*
ANE GBR	GREAT BARRINGTON	MA	336389.	109635.	345.	2.23*	2.96*
ANE 0B5	TURNERS FALLS	MA	316853.	64040.	304.	1.99*	2.53*
ANE PSF	PITTSFIELD MUNI	MA	170245.	146820.	91.	3.32	2.11
ANE 1B9	MANSFIELD MUNI	MA	221630.	52787.	192.	1.42*	1.82*
ANE 0B6	CHATHAM MUNI	MA	208922.	63987.	202.	1.40*	1.81*

ANE	PYM	PLYMOUTH MUNI	PLYMOUTH	MA	183731.	72828.	0.	1.95	1.70
ANE	380	SOUTHBIDGE MUNI	SOUTHBIDGE	MA	207739.	43401.	210.	1.60*	1.67*
ANE	GDM	GARDNER MUNI	GARDNER	MA	197224.	34581.	202.	1.24*	1.54*
ANE	286	NORTH ADAMS MUNICIPAL/HARRIMAN/	NORTH ADAMS	MA	62116.	113824.	0.	1.01	1.17
ANE	782	LA FLEUR	NORTHAMPTON	MA	50183.	66173.	0.	0.70	0.77
ANE	886	HAVERHILL	HAVERHILL	MA	69888.	17685.	49.	0.47*	0.58*
ANE	FLR	FALL RIVER MUNI	FALL RIVER	MA	60306.	24613.	0.	1.99	0.56
ANE	981	MARLBORO	MARLBORO	MA	52179.	17035.	0.	0.52	0.46
ANE	MA07	NORFOLK	NORFOLK	MA	51859.	16927.	0.	0.52	0.46
ANE	885	BARRE/HILLER	BARRE /BARRE PLAINS/	MA	46946.	15323.	0.	0.47	0.41
ANE	984	SHIRLEY	SHIRLEY	MA	37036.	13184.	0.	0.38	0.33
ANE	186	HOPEDALE-DRAPER	HOPEDALE	MA	34618.	14827.	0.	0.37	0.33
ANE	282	PLUM ISLAND	NEWBURYPORT	MA	28091.	15178.	0.	0.30	0.29
ANE	PMX	METROPOLITAN	PALMER	MA	19938.	21463.	0.	0.26	0.28
ANE	383	STERLING	STERLING	MA	17792.	16740.	0.	0.22	0.23*
ANE	ORE	ORANGE MUNI	ORANGE	MA	29104.	5153.	28.	0.18*	0.23*
ANE	586	FALMOUTH	FALMOUTH	MA	14862.	7594.	0.	0.16	0.15
ANE	MA04	HAVERHILL-RIVERSIDE	HAVERHILL	MA	11561.	3773.	0.	0.12	0.10
ANE	MA03	HATFIELD-PILGRIM	HATFIELD	MA	10362.	3382.	0.	0.10	0.09
ANE	PQI	NORTHERN MAINE REGIONAL ARPT	PRESQUE ISLE	ME	606410.	201353.	653.	2.58	5.37
ANE	AUG	AUGUSTA STATE	AUGUSTA	ME	555076.	199910.	568.	3.85	5.02
ANE	SFM	SANFORD MUNI	SANFORD	ME	589308.	99466.	592.	2.88	4.58
ANE	WVL	WATERVILLE ROBERT LAFLEUR	WATERVILLE	ME	421882.	436.	436.	2.62	3.97
ANE	FVE	NORTHERN AROOSTOOK REGIONAL	FRENCHVILLE	ME	467215.	123174.	773.	5.00	3.92
ANE	OLD	DEWITT FLD.OLD TOWN MUNI	OLD TOWN	ME	322945.	139186.	252.	1.81	3.07
ANE	B19	BIDDEFORD MUNI	BIDDEFORD	ME	338960.	84716.	330.	2.21*	2.82*
ANE	B20	EASTERN SLOPES REGIONAL	FRYEBURG	ME	253024.	44343.	246.	1.59*	1.98*
ANE	HUL	HOULTON INTL	HOULTON	ME	234738.	39402.	264.	1.28	1.82
ANE	MLT	MILLINOCKET MUNI	MILLINOCKET	ME	211527.	41993.	214.	1.34*	1.68*
ANE	RKD	KNOX COUNTY REGIONAL	ROCKLAND	ME	102000.	136024.	4.	4.35	1.58
ANE	CAR	CARIBOU MUNI	CARIBOU	ME	171556.	57266.	159.	1.14*	1.52*
ANE	LEW	AUBURN-LEWISTON MUNI	AUBURN-LEWISTON	ME	69703.	128114.	0.	3.10	1.31
ANE	287	PITTSFIELD MUNI	PITTSFIELD	ME	162712.	28284.	166.	1.03*	1.27*
ANE	888	HANCOCK COUNTY-BAR HARBOR	BAR HARBOR	ME	64376.	126374.	0.	1.17	1.27
ANE	387	BELFAST MUNI	BELFAST	ME	130681.	39052.	121.	0.85*	1.13*
ANE	385	TWITCHELL	TURNER	ME	65616.	62675.	0.	0.80	0.85
ANE	989	WISCASSET	WISCASSET	ME	74192.	39438.	0.	2.41	0.75
ANE	818	OXFORD COUNTY REGIONAL	NORWAY	ME	32860.	10725.	0.	0.34	0.29
ANE	DNK	CENTRAL MAINE ARPT OF NORRIDGEWOCK	NORRIDGEWOCK	ME	30444.	9938.	0.	0.31	0.27
ANE	381	GREENVILLE MUNI	GREENVILLE	ME	31121.	5943.	32.	0.33	0.25
ANE	PNN	PRINCETON MUNI	PRINCETON	ME	30571.	5810.	27.	0.21	0.24
ANE	784	MACHIAS VALLEY	MACHIAS	ME	26931.	8791.	0.	0.28	0.24
ANE	082	BREWER	BREWER	ME	16259.	5308.	0.	0.16	0.14
ANE	180	SENATOR OWEN BREWSTER	DEXTER	ME	11958.	3903.	0.	0.12	0.11
ANE	648	LINCOLN REGIONAL	LINCOLN	ME	11560.	2911.	42.	0.32	0.10
ANE	785	FORT KENT MUNI	FORT KENT	ME	10630.	3469.	0.	0.11	0.09
ANE	821	SUGARLOAF REGIONAL	CARRABASSETT	ME	6343.	2239.	0.	0.07	0.06
ANE	578	ISLESBORO	ISLESBORO	ME	7127.	2327.	0.	0.07	0.06
ANE	880	RANGELEY MUNI	RANGELEY	ME	5808.	1895.	0.	0.06	0.05
ANE	598	NEWTON FIELD	JACKMAN	ME	4026.	1314.	0.	0.04	0.04
ANE	081	COL DYKE FIELD	BETHEL	ME	611119.	205315.	611.	3.46	5.42
ANE	LCI	LACONIA MUNI	LACONIA	NH	491982.	187843.	485.	2.96	4.52
ANE	EEN	DILLANT-HOPKINS	KEENE	NH	304896.	57600.	292.	2.01*	2.41*
ANE	BML	BERLIN MUNI	BERLIN	NH	228754.	93195.	208.	1.53*	2.14*
ANE	AFN	JAFFREY FIELD	JAFFREY	NH	163334.	142558.	0.	6.76	2.03
ANE	ASH	BOIRE FIELD	NASHUA	NH	162771.	63514.	0.	1.64	1.50
ANE	681	SKYHAVEN	ROCHESTER	NH	30621.	96466.	0.	0.60	0.84
ANE	CWN	WHITE MOUNTAIN	NORTH CONWAY	NH					

ANE	CNH	CLAREMONT MUNI	NH	71116.	20256.	67.	0.46*	0.61*
ANE	HIE	WHITEFIELD REGIONAL	NH	42096.	30140.	28.	0.81	0.48
ANE	783	HAMPTON AIRFIELD	NH	19563.	6386.	0.	0.19	0.17
ANE	589	DEAN MEMORIAL	NH	3171.	6749.	0.	0.05	0.07
ANE	283	PARLIN FIELD	NH	6667.	2176.	0.	0.07	0.06
ANE	284	NEWPORT STATE	RI	639427.	205065.	723.	3.06	5.61
ANE	SFZ	NORTH CENTRAL STATE	RI	176136.	158604.	2.	7.77	2.22
ANE	WST	WESTERLY STATE	RI	77599.	130689.	0.	3.79	1.38
ANE	BID	BLOCK ISLAND STATE	RI	61565.	125350.	1.	3.77	1.24
ANE	998	QUONSET STATE	RI	148561.	37549.	72.	1.93*	1.24*
ANE	RI04	RICHMOND	RI	3397.	1109.	0.	0.03	0.03
ANE	VSF	SPRINGFIELD STATE /HARTNESS/	VT	197252.	141772.	162.	1.59*	2.25*
ANE	MPV	EDWARD F KNAPP STATE	VT	95648.	123773.	77.	1.26	1.46
ANE	RUT	RUTLAND STATE	VT	47951.	120993.	1.	2.56	1.12
ANE	680	MIDDLEBURY STATE	VT	49290.	57935.	0.	0.64	0.71
ANE	688	CALEDONIA COUNTY	VT	75596.	13397.	71.	0.46*	0.59*
ANE	MVL	MORRISVILLE-STOWE STATE	VT	69587.	12402.	65.	0.42*	0.54*
ANE	EFK	NEWPORT STATE	VT	35555.	33664.	26.	0.46	0.34*
ANE	187	FRANKLIN COUNTY	VT	43255.	7505.	42.	0.28*	0.32
ANE	087	WARREN-SUGARBUSH	VT	36693.	11979.	0.	0.37	0.23
ANE	289	POST MILLS	VT	26579.	8675.	0.	0.27	0.23
ANE	685	CHAMPLAIN	VT	7511.	2452.	0.	0.07	0.07

NORTHWEST REGION

ANM	GXY	WELD COUNTY MUNI	CO	2718554.	573525.	2508.	16.91*	21.87*
ANM	3V5	DOWNTOWN FORT COLLINS AIRPARK	CO	878760.	257953.	818.	5.68*	7.55*
ANM	FNL	FORT COLLINS-LOVELAND MUNI	CO	414931.	213962.	1303.	8.81	4.18
ANM	EGE	EAGLE COUNTY	CO	405500.	177792.	343.	2.73*	3.88*
ANM	GUC	GUNNISON COUNTY	CO	390324.	171297.	365.	2.85*	3.73*
ANM	SBS	ROUTT COUNTY STOL	CO	309239.	156520.	296.	2.49*	3.09*
ANM	DR0	DURANGO-LA PLATA COUNTY	CO	235780.	163774.	113.	1.83	2.65
ANM	48V	TRI-COUNTY	CO	235903.	106037.	0.	2.35	2.27
ANM	LHX	LA JUNTA MUNI	CO	272240.	66021.	222.	2.86	2.25
ANM	MTJ	MONTEROSE COUNTY	CO	163954.	148272.	65.	5.19	2.05
ANM	STK	CROSSON FIELD	CO	205554.	102993.	171.	2.01	2.05
ANM	2V2	LONGMONT MUNI	CO	225767.	79039.	0.	1.93	2.03
ANM	TAD	LAS ANIMAS COUNTY	CO	184592.	84770.	175.	1.45*	1.79*
ANM	IV5	BOULDER MUNI	CO	172139.	76101.	0.	1.81	1.65
ANM	01V	COLUMBINE	CO	179048.	58441.	0.	1.75	1.58
ANM	LAA	LAMAR MUNI	CO	92215.	122514.	64.	1.82	1.43
ANM	GWS	GLENWOOD SPRINGS MUNI	CO	60904.	121436.	0.	1.02	1.21
ANM	HDN	YAMPA VALLEY	CO	58840.	109667.	20.	2.53	1.12
ANM	00V	MEADOW LAKE	CO	107842.	40545.	0.	1.08	0.99
ANM	CEZ	CORTEZ-MONTEZUMA COUNTY	CO	28303.	112036.	15.	0.65	0.93
ANM	AK0	AKRON-WASHINGTON CO	CO	107443.	19921.	93.	1.10	0.85
ANM	5C00	ANIMAS AIR PARK	CO	53197.	65257.	0.	0.69	0.79
ANM	2V5	WRAY MUNI	CO	48773.	62381.	0.	0.62	0.74
ANM	2V1	STEVENS FIELD	CO	34998.	67654.	0.	0.53	0.68
ANM	7V2	NORTH FORK VALLEY	CO	14448.	82950.	0.	0.41	0.65
ANM	2V3	MEEKER	CO	30238.	63006.	0.	0.48	0.62
ANM	CAG	CRAIG-MOFFAT	CO	65042.	25837.	0.	0.65	0.60
ANM	2V6	YUMA MUNI	CO	42316.	45685.	0.	0.52	0.58
ANM	1V9	BLAKE FIELD	CO	27132.	54057.	0.	0.44	0.54
ANM	CO12	BRIGHTON VAN-AIRE ESTATES	CO	59259.	19339.	0.	0.60	0.52
ANM	GNB	GRANBY-GRAND COUNTY	CO	13333.	58318.	0.	0.33	0.48

ANM	RIL	GARFIELD COUNTY	CO	31665.	36899.	0.	0.40	0.46
ANM	4V0	RANGELY	CO	44682.	19928.	0.	0.43	0.43
ANM	08V	SAN LUIS VALLEY	CO	29180.	25493.	0.	0.36	0.36
ANM	0V2	HARRIET ALEXANDER FIELD	CO	22180.	28519.	0.	0.29	0.34
ANM	LXV	LAKE COUNTY	CO	35057.	16788.	0.	0.36	0.34
ANM	1V8	LEACH	CO	31907.	13122.	0.	0.33	0.30
ANM	3V4	FORT MORGAN MUNI	CO	36415.	9438.	119.	0.77	0.30
ANM	3V1	BURLINGTON MUNI	CO	23237.	15580.	0.	0.25	0.26
ANM	6V3	LITTLETON	CO	28733.	9379.	0.	0.28	0.25
ANM	7V9	CITY AND COUNTY	CO	20544.	17334.	0.	0.24	0.25
ANM	8V5	HOLYOKE	CO	21948.	13626.	0.	0.24	0.24
ANM	20V	KREMMLING	CO	12444.	14689.	0.	0.16	0.18
ANM	6V6	HOPKINS-MONTROSE COUNTY	CO	20244.	6607.	0.	0.20	0.18
ANM	1V6	FREMONT COUNTY	CO	18775.	6128.	0.	0.18	0.17
ANM	CO50	ELLICOTT INTL	CO	18326.	5983.	0.	0.18	0.16
ANM	5V4	CALHAN	CO	18447.	6021.	0.	0.18	0.16
ANM	7V5	BRUSH MUNI	CO	15239.	7791.	0.	0.15	0.15
ANM	Q39	MINERAL COUNTY MEMORIAL	CO	12121.	3956.	0.	0.12	0.11
ANM	7V8	JULESBURG MUNI	CO	10827.	6260.	0.	0.11	0.11
ANM	33V	WALDEN-JACKSON COUNTY	CO	8130.	2653.	0.	0.08	0.07
ANM	8V7	SPRINGFIELD MUNI	CO	6727.	2196.	0.	0.07	0.06
ANM	9V7	EADS MUNI	CO	6948.	2316.	0.	0.07	0.06
ANM	09V	FOWLER	CO	6730.	2197.	0.	0.07	0.06
ANM	7V1	BUENA VISTA MUNI	CO	6097.	1990.	0.	0.06	0.05
ANM	8V1	DEL NORTE MUN AND CO	CO	3320.	1084.	0.	0.03	0.03
ANM	4V1	JOHNSON FIELD	CO	3572.	1166.	0.	0.04	0.03
ANM	29V	VALLEY AIRPORT	CO	2997.	978.	0.	0.03	0.03
ANM	04V	SAGUACHE MUNI	CO	1159.	378.	0.	0.01	0.01
ANM	COE	COEUR D ALENE AIR TERM	ID	780993.	239949.	690.	4.97*	6.78*
ANM	SUN	FRIEDMAN MEMORIAL	ID	124990.	146154.	0.	1.60	1.80
ANM	U35	CALDWELL INDUSTRIAL	ID	111008.	135721.	0.	1.33	1.64
ANM	S67	NAMPA MUNI	ID	116434.	94512.	0.	1.36	1.40
ANM	MYL	MC CALL	ID	73252.	129269.	0.	1.13	1.35
ANM	S73	KAMIAH MUNI	ID	63431.	106219.	0.	0.96	1.13
ANM	BYI	BURLEY MUNI	ID	83833.	75472.	0.	3.65	1.06
ANM	SMN	SALMON	ID	34489.	116619.	0.	0.86	1.00
ANM	U02	MCCARLEY FLD	ID	56830.	90255.	0.	0.83	0.98
ANM	U11	REXBURG-MADISON COUNTY	ID	68932.	69492.	129.	1.83	0.92
ANM	S68	OROFINO MUNI	ID	25625.	71310.	0.	0.49	0.64
ANM	S80	IDAHO COUNTY	ID	33237.	59277.	0.	0.51	0.61
ANM	S86	COUNTY-CITY	ID	43816.	42232.	0.	0.48	0.61
ANM	S87	WEISER MUNI	ID	47585.	17976.	0.	0.49	0.44
ANM	U76	MOUNTAIN HOME MUNI	ID	44497.	19341.	0.	0.47	0.42
ANM	655	BOUNDARY COUNTY	ID	29636.	33850.	0.	0.39	0.42
ANM	U59	TETON PEAKS/DRIGGS MUNI/	ID	19584.	42705.	0.	0.33	0.41
ANM	U01	AMERICAN FALLS	ID	35710.	25142.	0.	0.40	0.40
ANM	S83	SHOSHONE COUNTY	ID	29596.	27874.	0.	0.30	0.38
ANM	U15	CHALLIS	ID	32296.	40831.	0.	0.27	0.36
ANM	U73	JEROME COUNTY	ID	18230.	30168.	0.	0.35	0.32
ANM	U12	ST ANTHONY MUNI	ID	25385.	19531.	0.	0.27	0.32
ANM	GNG	GOODING MUNI	ID	37560.	10104.	0.	0.30	0.30
ANM	151	ECKHART INTL	ID	7687.	30961.	0.	0.20	0.30
ANM	S89	CRAIGMONT MUNI	ID	23849.	7784.	0.	0.31	0.27
ANM	S78	EMMETT MUNI	ID	19066.	11041.	0.	0.24	0.21
ANM	U57	ARCO-BUTTE COUNTY	ID	20454.	7968.	0.	0.21	0.20
ANM	U03	BUHL MUNI	ID	15217.	7410.	0.	0.18	0.19
ANM	U10	PRESTON	ID	14636.	5861.	0.	0.16	0.15
ANM	U56	RIGBY	ID	10578.	9076.	0.	0.15	0.14
ANM	U82	COUNCIL MUNI	ID			0.	0.13	0.13

ANM S75	PAYETTE MUNI	PAYETTE	11628.	3796.	0.	0.12	0.10
ANM S62	HENLEY AERODROME	ATHOL	10628.	3469.	0.	0.10	0.09
ANM S66	HOMEDALE MUNI	HOMEDALE	8941.	2918.	0.	0.09	0.08
ANM U78	SODA SPRINGS MUNI	SODA SPRINGS	5554.	4256.	0.	0.07	0.07
ANM S61	ATHOL	ATHOL	7721.	2520.	0.	0.08	0.07
ANM U36	ABERDEEN MUNI	ABERDEEN	7930.	2588.	0.	0.08	0.07
ANM U107	BEAR LAKE COUNTY	PARIS	4923.	2627.	0.	0.05	0.05
ANM U56	PRIEST RIVER MUNI	PRIEST RIVER	5292.	1727.	0.	0.05	0.05
ANM DBS	DUBOIS MUNI	DUBOIS	3333.	1088.	0.	0.03	0.03
ANM MLS	FRANK WILEY FIELD	MILES CITY	300836.	98617.	261.	3.99	2.65
ANM OLF	WOLF POINT INTL	WOLF POINT	283622.	110533.	288.	0.74*	2.62*
ANM CTB	CUT BANK MUNI	CUT BANK	248884.	71447.	228.	2.74	2.13
ANM SDY	SYDNEY-RICHLAND MUNI	SYDNEY	202255.	89058.	186.	2.48	1.94
ANM DLN	DILLON	DILLON	206166.	47367.	209.	1.51*	1.68*
ANM BZN	GALLATIN FLD	BOZEMAN	95617.	128828.	50.	1.88	1.49
ANM BTM	BERT MOONEY	BUTTE	78559.	131000.	0.	4.55	1.39
ANM LMT	LEWISTOWN MUNI	LEWISTOWN	117864.	59719.	284.	3.67	1.18
ANM LVM	MISSION FIELD	LIVINGSTON	40588.	89089.	0.	1.07	0.86
ANM S01	CONRAD	CONRAD	96557.	31908.	80.	1.23	0.85
ANM GDV	DAWSON COMMUNITY	GLENDIVE	55565.	65067.	0.	2.49	0.80
ANM SBX	SHELBY	SHELBY	41847.	43987.	0.	1.67	0.57
ANM HYS	YELLOWSTONE	WEST YELLOWSTONE	11001.	63035.	0.	0.35	0.49
ANM S27	KALISPELL CITY	KALISPELL	48761.	15915.	0.	0.51	0.43
ANM 6S5	HAMILTON	HAMILTON	34711.	27821.	0.	0.42	0.42
ANM 4U5	CHOTEAU	CHOTEAU	31987.	28223.	0.	0.40	0.40
ANM PWD	SHER-WOOD	PLENTYWOOD	34285.	23809.	0.	0.40	0.39
ANM RED	RED LODGE	RED LODGE	31972.	22114.	0.	0.37	0.36
ANM MLK	MALTA	MALTA	28141.	19336.	0.	0.33	0.32
ANM S71	CHINOOK MUNI	CHINOOK	32946.	15748.	0.	0.36	0.32
ANM 325	STEVENSVILLE	STEVENSVILLE	35470.	11579.	0.	0.37	0.32
ANM MT02	FAIRGROUNDS AIRPARK	HARDIN	24230.	18877.	0.	0.28	0.29
ANM 6S8	LAUREL MUN	LAUREL	33285.	10863.	0.	0.34	0.29
ANM 3U6	BAKER MUNI	BAKER	24531.	18158.	0.	0.29	0.28
ANM S85	BIG SKY FIELD	CULBERTSON	31110.	10154.	0.	0.32	0.27
ANM 4U6	CIRCLE TOWN COUNTY	CIRCLE	29395.	9594.	0.	0.30	0.26
ANM BDX	BROADUS	BROADUS	22439.	14901.	0.	0.26	0.25
ANM 650	BIG TIMBER	BIG TIMBER	20253.	16687.	0.	0.25	0.25
ANM S59	LIBBY	LIBBY	17609.	18367.	0.	0.23	0.24
ANM 4U3	LIBERTY COUNTY	CHESTER	23131.	12544.	0.	0.26	0.24
ANM U05	RIDDICK FIELD	PHILIPSBURG	15635.	18915.	0.	0.21	0.23
ANM 851	POLSON	POLSON	23598.	7702.	0.	0.24	0.21
ANM 952	SCOBAY	SCOBAY	23888.	7796.	0.	0.25	0.21
ANM 3U3	ANACONDA	ANACONDA	18373.	10991.	0.	0.21	0.20
ANM 153	TILLITT FIELD	FORSYTH	21195.	6918.	0.	0.22	0.19
ANM 385	DEER LODGE-CITY-COUNTY	DEER LODGE	19323.	8820.	0.	0.21	0.19
ANM 8U8	TOWNSEND	TOWNSEND	19823.	6470.	0.	0.21	0.17
ANM 9U0	TURNER	TURNER	16641.	5966.	0.	0.18	0.15
ANM 653	COLUMBUS	COLUMBUS	10499.	8421.	0.	0.13	0.13
ANM 405	EUREKA	EUREKA	13117.	4281.	0.	0.14	0.12
ANM 757	VALIER	VALIER	9089.	2967.	0.	0.09	0.08
ANM 3U4	ST LABRE MISSION	ASHLAND	3795.	6723.	0.	0.06	0.07
ANM 8U6	TERRY	TERRY	5414.	1767.	0.	0.06	0.05
ANM 5U2	EKALAKA	EKALAKA	5284.	1724.	0.	0.05	0.05
ANM 485	HARLEM	HARLEM	4958.	1618.	0.	0.05	0.04
ANM 564	STANFORD	STANFORD	4711.	1538.	0.	0.05	0.04
ANM 295	GARDINER	GARDINER	3724.	1215.	0.	0.04	0.03
ANM 425	POPLAR	POPLAR	2873.	938.	0.	0.03	0.03
ANM 3U8	BIG SANDY	BIG SANDY	3450.	1126.	0.	0.04	0.03
ANM 5U3	BIG SKY	ENNIS	1450.	473.	0.	0.01	0.01

ANM 352	AURORA STATE	OR	2861942.	597135.	2639.	17.77*	22.98*
ANM 0TH	NORTH BEND MUNI	OR	1970991.	437321.	1982.	6.74	16.00
ANM 455	MC MINNVILLE MUNI	OR	1146481.	303476.	1049.	7.33*	9.63*
ANM CVO	CORVALLIS MUNI	OR	666785.	225747.	518.	6.49	5.93
ANM 154	SCAPPOOSE INDUSTRIAL AIRPARK	OR	514667.	194922.	422.	3.16*	4.71*
ANM S07	BEND MUNI	OR	409943.	186542.	335.	6.74	3.96
ANM LGD	LA GRANDE MUNI	OR	402081.	165349.	388.	3.04*	3.77*
ANM DLS	THE DALLES MUNI	OR	425002.	141167.	405.	3.03*	3.76*
ANM RDM	ROBERTS FIELD	OR	362245.	175710.	316.	4.84	3.57
ANM ONP	NEWPORT MUNI	OR	269098.	113113.	264.	2.25	2.54
ANM LKV	LAKE COUNTY-LAKEVIEW	OR	249750.	122707.	245.	2.16*	2.47*
ANM S12	ALBANY MUNI	OR	161124.	157953.	0.	2.07	2.12
ANM 358	JOSEPHINE COUNTY /GRANTS PASS/	OR	125129.	145904.	0.	1.71	1.80
ANM ONO	ONTARIO MUNI	OR	104988.	135877.	0.	4.91	1.60
ANM 256	SPORTSMAN AIRPARK	OR	136655.	93507.	0.	1.40	1.53
ANM RBG	ROSEBURG MUNI	OR	93078.	135700.	2.	4.26	1.52
ANM S03	ASHLAND MUNI-SUMNER PARKER FIELD	OR	87940.	134066.	0.	1.34	1.48
ANM S05	BANDON STATE	OR	77677.	130714.	0.	1.27	1.38
ANM 451	GOLD BEACH MUNI	OR	73072.	129210.	0.	1.23	1.34
ANM BND	BURNS MUNI	OR	67557.	127410.	0.	1.26	1.30
ANM 61S	COTTAGE GROVE STATE	OR	61602.	125467.	0.	1.10	1.24
ANM S22	HERMISTON MUNICIPAL	OR	73022.	107764.	2.	2.99	1.20
ANM 755	INDEPENDENCE STATE	OR	59170.	86748.	0.	0.84	0.97
ANM 052	OREGON CITY AIRPARK	OR	87960.	46978.	0.	0.87	0.90
ANM 753	STARK'S TWIN OAKS AIRPARK	OR	93951.	30660.	0.	0.91	0.83
ANM BOK	BROOKINGS STATE	OR	55297.	64579.	0.	0.61	0.80
ANM 452	HOOD RIVER	OR	49411.	62653.	0.	0.69	0.74
ANM S21	SUNRIVER	OR	38000.	66059.	0.	0.56	0.69
ANM BKE	BAKER MUNI	OR	41221.	51575.	0.	1.66	0.62
ANM 759	LENHARDT AIRPARK	OR	61552.	20086.	0.	0.60	0.54
ANM 77S	HOBBY FIELD	OR	43060.	32034.	0.	0.40	0.50
ANM 459	MULINO	OR	53045.	17315.	0.	0.52	0.47
ANM S30	LEBANON STATE	OR	37619.	33788.	0.	0.45	0.47
ANM 959	LEXINGTON	OR	28952.	37010.	0.	0.38	0.44
ANM 652	FLORENCE MUNI	OR	18907.	47385.	0.	0.34	0.44
ANM 854	ENTERPRISE MUNI	OR	16887.	40632.	0.	0.33	0.38
ANM S45	SILETZ BAY STATE	OR	18174.	38076.	0.	0.30	0.37
ANM 359	CONDON STATE	OR	24097.	29076.	0.	0.33	0.35
ANM S6S	SEASIDE STATE	OR	18015.	34413.	0.	0.28	0.35
ANM S33	CITY-COUNTY	OR	31955.	16370.	3.	1.21	0.32
ANM 16S	TRI-CITY STATE	OR	30554.	15974.	0.	0.33	0.31
ANM S39	PRINEVILLE	OR	26255.	18417.	0.	0.30	0.30
ANM S59	ESTACADA	OR	32707.	10675.	0.	0.32	0.29
ANM U33	JOHN DAY STATE	OR	21056.	19966.	0.	0.23	0.27
ANM 26U	MC DERMITT STATE	OR	18716.	15664.	0.	0.22	0.23
ANM 257	CHILOQUIN STATE	OR	10173.	24829.	0.	0.19	0.23
ANM 03S	RICHES	OR	24178.	7890.	0.	0.23	0.21
ANM 46S	JOE CARDS AIRPARK	OR	15907.	10750.	0.	0.17	0.18
ANM 0R78	DANIELS FIELD	OR	11471.	15349.	0.	0.16	0.18
ANM 10S	HUTCHINSON	OR	19730.	6438.	0.	0.19	0.17
ANM S48	COUNTRY SQUIRE AIRPARK	OR	18814.	6140.	0.	0.18	0.17
ANM 354	ILLINOIS VALLEY /USFS/	OR	18200.	5939.	0.	0.18	0.16
ANM S49	MILLER MEMORIAL AIRPARK	OR	12918.	9775.	0.	0.14	0.15
ANM S50	OAKRIDGE STATE	OR	4533.	18158.	0.	0.10	0.15
ANM S47	TILLAMOOK	OR	10068.	6798.	0.	0.12	0.11
ANM 62S	CHRISTMAS VALLEY	OR	7532.	8017.	0.	0.09	0.10
ANM S51	GEORGE FELT	OR	9523.	3108.	0.	0.09	0.08
ANM 0R62	CROW-MAG	OR	8375.	2733.	0.	0.08	0.07
ANM 654	DAVIS	OR	4834.	1577.	0.	0.05	0.04

ANM	OR06	INLAND HELICOPTERS	GRANTS PASS	762.	5808.	0.	0.03	0.04
ANM	S15	TROH'S MEMORIAL AIRPARK	PORTLAND	2810.	917.	0.	0.03	0.02
ANM	415	ROGUE-AIR	SHADY COVE	2240.	1399.	0.	0.02	0.02
ANM	PVU	PROVO MUNI	PROVO	195080.	169036.	0.	7.27	2.42
ANM	VEL	VERNAL	VERNAL	168945.	139895.	125.	2.52	2.05
ANM	LGU	LOGAN-CACHE	LOGAN	121033.	144870.	0.	4.13	1.77
ANM	BTF	SALT LAKE SKYPARK	BOUNTIFUL	93920.	136023.	0.	1.42	1.53
ANM	BMC	BRIGHTMAN CITY	BRIGHTMAN CITY	123832.	105920.	84.	1.78	1.53
ANM	U42	SALT LAKE CITY MUNI 2	SALT LAKE CITY	134209.	80020.	0.	1.51	1.42
ANM	SGU	SAINT GEORGE MUNI	ST. GEORGE	66300.	126983.	1.	2.72	1.28
ANM	CDC	CEDAR CITY MUNI	CEDAR CITY	57536.	122871.	8.	2.63	1.20
ANM	RIF	RICHFIELD MUNI	RICHFIELD	55785.	123571.	0.	1.07	1.19
ANM	PUC	CARBON COUNTY	PRICE	48095.	121025.	0.	0.97	1.12
ANM	BDG	BLANDING MUNI	BLANDING	48203.	106673.	22.	1.35	1.03
ANM	KNB	KANAB MUNI	KANAB	27864.	114457.	0.	0.77	0.95
ANM	69V	HUNTINGTON MUNI	HUNTINGTON	27865.	114458.	0.	0.77	0.95
ANM	DTA	DELTA MUNI	DELTA	25188.	111480.	0.	0.69	0.91
ANM	U20	GREEN RIVER	GREEN RIVER	10418.	105966.	0.	0.55	0.77
ANM	U77	SPANISH FORK-SPRINGVILLE	SPANISH FORK	45446.	69571.	0.	0.62	0.76
ANM	U43	SAN JUAN COUNTY	MONTICELLO	8901.	99237.	0.	0.45	0.72
ANM	U69	DUCHESNE MUNI	DUCHESNE	64706.	38877.	58.	0.46*	0.69*
ANM	36U	HEBER VALLEY	HEBER	56317.	42889.	0.	0.65	0.66
ANM	BCE	BRYCE CANYON	BRYCE CANYON	53543.	35399.	50.	0.54*	0.59*
ANM	74V	ROOSEVELT MUNI	ROOSEVELT	7228.	81696.	0.	0.33	0.59
ANM	CNY	CANYONLANDS FIELD	MOAB	21855.	61895.	0.	0.69	0.56
ANM	U55	PANGUITCH MUNI	PANGUITCH	4393.	61589.	0.	0.24	0.44
ANM	ENV	WENDOVER	WENDOVER	34145.	24688.	0.	0.40	0.39
ANM	41U	MANTI-EPHRAIM	MANTI	10556.	41789.	0.	0.23	0.35
ANM	U27	TREMONTON MUNI	TREMONTON	26871.	11581.	0.	0.27	0.26
ANM	U07	BULLFROG BASIN	GLEN CANYON NATL REC A	8826.	24779.	0.	0.16	0.22
ANM	U26	BOLINDER FIELD-TOOELE VALLEY	TOOELE	20648.	6741.	0.	0.20	0.18
ANM	U14	NEPHI MUNI	NEPHI	12166.	3242.	0.	0.12	0.10
ANM	42U	MORGAN MUNI	MORGAN	9731.	5341.	0.	0.10	0.10
ANM	44U	SALINA-GUNNISON	SALINA	8637.	4329.	0.	0.09	0.09
ANM	HVE	HANKSVILLE	HANKSVILLE	7665.	2502.	0.	0.07	0.07
ANM	1L9	PAROWAN	PAROWAN	7666.	2502.	0.	0.07	0.07
ANM	40U	MANILA	MANILA	7665.	2502.	0.	0.07	0.07
ANM	U22	HALLS CROSSING	GLEN CANYON NATL REC A	5606.	3277.	0.	0.06	0.06
ANM	U52	BEAVER MUNI	BEAVER	5837.	1905.	0.	0.06	0.05
ANM	1L8	HURRICANE	HURRICANE	4707.	1536.	0.	0.05	0.04
ANM	1L7	ESCALANTE MUNI	ESCALANTE	4580.	1495.	0.	0.04	0.04
ANM	38U	WAYNE WONDERLAND	LOA	2037.	1223.	0.	0.02	0.02
ANM	PWT	KITSAF COUNTY	BREMERTON	2173096.	455431.	2148.	9.53	17.46
ANM	KLS	KELSO-LONGVIEW	KELSO	1134135.	196488.	987.	6.51*	8.84*
ANM	EPH	EPHRATA MUNI	EPHRATA	913816.	167440.	738.	6.73	7.18
ANM	RLD	RICHLAND	RICHLAND	680080.	244497.	419.	8.51	6.14
ANM	HQM	BOWERMAN	HOQUIAM	593344.	199012.	503.	4.44	5.26
ANM	PUM	PULLMAN/MOSCOW REGIONAL	PULLMAN/MOSCOW, ID	522310.	194358.	336.	2.48	4.76
ANM	S50	AUBURN MUNI	AUBURN	448766.	251836.	0.	3.97	4.66
ANM	BLI	BELLINGHAM INTL	BELLINGHAM	492608.	195431.	469.	5.11	4.57
ANM	S88	ARLINGTON	ARLINGTON	402942.	235427.	0.	13.51	4.24
ANM	150	PUYALLUP INDUSTRIAL AIRPARK	PUYALLUP	339359.	216125.	0.	3.18	3.69
ANM	595	EVERGREEN FIELD	VANCOUVER	333633.	110209.	0.	3.26	2.95
ANM	EAT	PANGBORN FIELD	WENATCHEE	186394.	165129.	2.	6.76	2.34
ANM	CLM	WILLIAM R FAIRCHILD INTL	PORT ANGELES	155750.	156074.	6.	5.21	2.07
ANM	60S	PEARSON AIRPARK	VANCOUVER	216835.	70782.	0.	5.40	1.91
ANM	SHN	SANDERSON FIELD	SHELTON	136387.	111303.	426.	2.85	1.65
ANM	519	FRIDAY HARBOR	FRIDAY HARBOR	101958.	138637.	0.	1.17	1.60

ANM	544	SPANAWAY	SPANAWAY	WA	186129.	47180.	119.	1.35*	1.55*
ANM	755	SKAGIT REGIONAL/BAY VIEW	BURLINGTON/MT VERNON/	WA	70736.	128451.	0.	1.18	1.32
ANM	CLS	CHEHALIS-CENTRALIA	CHEHALIS	WA	133046.	43424.	0.	1.09	1.17
ANM	ELM	BOWERS FIELD	ELLENBURG	WA	147862.	26034.	138.	0.90*	1.16*
ANM	517	ORCAS ISLAND	EAST SOUND	WA	37425.	117577.	0.	0.81	1.03
ANM	765	OAK HARBOR AIR PARK	OAK HARBOR	WA	27391.	114304.	0.	0.59	0.94
ANM	S43	HARVEY FIELD	SHOHMISH	WA	103645.	33830.	0.	0.96	0.91
ANM	S31	LOPEZ ISLAND	LOPEZ	WA	35908.	100787.	0.	0.61	0.91
ANM	056	CLARK COUNTY	ORCHARDS	WA	99219.	36077.	0.	1.04	0.90
ANM	075	DEER PARK MUNI	DEER PARK	WA	100903.	32929.	0.	0.69	0.89
ANM	WA12	DE VERE FIELD	CLE ELUM	WA	18880.	98108.	0.	0.55	0.78
ANM	S95	MARTIN FIELD	COLLEGE PLACE	WA	69859.	33587.	0.	0.74	0.69
ANM	058	PORT ORCHARD	PORT ORCHARD	WA	78374.	25580.	0.	0.81	0.69
ANM	WA10	PORT OF CAMAS-WASHOUGAL	CAMAS	WA	67673.	22085.	0.	0.37	0.60
ANM	S60	KENMORE AIRHARBOR	KENMORE	WA	62481.	20392.	0.	0.60	0.55
ANM	BVU	BELLEVUE AIRFIELD	BELLEVUE	WA	56899.	22490.	0.	1.02	0.53
ANM	745	ANACORTES	ANACORTES	WA	59322.	19366.	0.	0.53	0.52
ANM	145	WESTPORT	WESTPORT	WA	13553.	58345.	0.	0.33	0.48
ANM	WA40	MOSES LAKE MUNI	MOSES LAKE	WA	54825.	17897.	0.	0.57	0.48
ANM	059	JEFFERSON COUNTY INTL	PORT TOWNSEND	WA	25395.	35251.	0.	0.35	0.40
ANM	S13	MARTHA LAKE	ALDERWOOD MANOR	WA	43431.	14180.	0.	0.44	0.38
ANM	S97	ANDERSON FIELD	BREWSTER	WA	1456.	17487.	0.	0.32	0.33
ANM	WA22	ELMA MUNICIPAL	ELMA	WA	9106.	20152.	0.	0.28	0.33
ANM	S42	APEX AIRPARK	SILVERDALE	WA	36383.	11877.	0.	0.37	0.32
ANM	S18	FORKS	FORKS	WA	26102.	20601.	0.	0.29	0.31
ANM	OMK	OMK	OMK	WA	29969.	9781.	0.	0.25	0.26
ANM	WA05	GOHEEN	BATTLE GROUND	WA	29388.	9592.	0.	0.29	0.26
ANM	S36	CREST AIRPARK	KENT	WA	29843.	10010.	0.	0.30	0.26
ANM	S40	PROSSER	PROSSER	WA	29518.	9635.	0.	0.30	0.26
ANM	S52	INTERCITY	WINTHROP	WA	26717.	8719.	0.	0.17	0.24
ANM	S70	OTHELLO MUNI	OTHELLO	WA	25417.	8296.	0.	0.25	0.22
ANM	635	COLVILLE MUNI	COLVILLE	WA	24558.	8016.	0.	0.25	0.22
ANM	S26	OCEAN SHORES MUNI	OCEAN SHORES	WA	23935.	7810.	0.	0.24	0.21
ANM	WA51	R & K SKYRANCH	ROCHESTER	WA	21814.	7659.	0.	0.22	0.20
ANM	155	SUNNYSIDE MUNI	SUNNYSIDE	WA	19072.	11044.	0.	0.21	0.20
ANM	852	CASHMERE-DRYDEN	CASHMERE	WA	20312.	9583.	0.	0.21	0.20
ANM	S94	WHITMAN CO MEMORIAL	COLEFAX	WA	21437.	6997.	0.	0.20	0.19
ANM	WA56	KURTZER FLYING SERVICE	SEATTLE	WA	20051.	6544.	0.	0.17	0.18
ANM	115	SEKIU	SEKIU	WA	20274.	6616.	0.	0.20	0.18
ANM	TDO	TOLEDO-WINLOCK MUNI	TOLEDO	WA	19098.	6234.	0.	0.19	0.17
ANM	254	NEW WARDEN	WARDEN	WA	17932.	5853.	0.	0.18	0.16
ANM	S98	VISTA FIELD	KENNEWICK	WA	18679.	6098.	0.	0.19	0.16
ANM	S10	CHELAN MUNI	CHELAN	WA	13584.	9253.	0.	0.14	0.15
ANM	WA77	ENUMCLAW	ENUMCLAW	WA	17068.	5571.	0.	0.16	0.15
ANM	057	DOROTHY SCOTT	OROVILLE	WA	16564.	5406.	0.	0.15	0.15
ANM	WA09	BLAINE MUNI	BLAINE	WA	15687.	7370.	0.	0.17	0.15
ANM	WA14	CONNELL CITY	CONNELL	WA	16313.	5325.	0.	0.16	0.14
ANM	WA0	(NEW)	BLAINE	WA	15355.	5012.	0.	0.04	0.14
ANM	S35	OKANOGAN LEGION	OKANOGAN	WA	10354.	8772.	0.	0.12	0.13
ANM	WA38	FLYING F RANCH	MONROE	WA	15228.	4971.	0.	0.15	0.13
ANM	685	DAVENPORT	DAVENPORT	WA	13643.	4453.	0.	0.13	0.12
ANM	WA33	LYNDEN	LYNDEN	WA	13436.	4386.	0.	0.13	0.12
ANM	255	WATERVILLE	WATERVILLE	WA	13075.	4268.	0.	0.13	0.12
ANM	705	MEAD FLYING SERVICE	MEAD	WA	13062.	4264.	0.	0.13	0.12
ANM	335	PRO FIELD	RITZVILLE	WA	13285.	4336.	0.	0.13	0.12
ANM	WA69	WAX ORCHARDS	VASHON	WA	12295.	4013.	0.	0.11	0.11
ANM	251	WASHON ISLAND	VASHON	WA	11498.	3753.	0.	0.12	0.10
ANM	WA72	WESTERN AIRPARK INC	YELM	WA	10826.	3533.	0.	0.11	0.10
ANM	WA24	FRIDAY HARBOR SPB	FRIDAY HARBOR	WA	10039.	3276.	0.	0.08	0.09
ANM	WA24	FRIDAY HARBOR AIR PARK	LANGLEY	WA	8717.	3928.	0.	0.09	0.08

ANM 735	WILLARD FIELD	WA	8971.	2928.	0.	0.09	0.08
ANM S23	IONE MUNI	WA	8524.	2782.	0.	0.09	0.08
ANM WA20	SWANSON	WA	7775.	2538.	0.	0.08	0.07
ANM 258	WILBUR	WA	8114.	2648.	0.	0.09	0.07
ANM WA43	ODESSA MUNI	WA	8353.	2726.	0.	0.08	0.07
ANM WA21	GRAND COULEE DAM	WA	8101.	2644.	0.	0.06	0.07
ANM 80WA	QUINCY MUNI	WA	7190.	2347.	0.	0.06	0.06
ANM WA35	CEDAR GROVE AIRPARK	WA	5268.	1720.	0.	0.05	0.05
ANM S93	CLE ELUM	WA	6198.	2023.	0.	0.05	0.05
ANM 259	WILLAPA HARBOR	WA	5020.	1638.	0.	0.04	0.04
ANM WA4	FERRY COUNTY	WA	3503.	1143.	0.	0.03	0.03
ANM WA15	COULEE CITY	WA	523.	171.	0.	0.01	0.00
ANM GCC	GILLETTE-CAMPBELL COUNTY	WY	774168.	234677.	779.	5.70*	6.70*
ANM COD	CODY MUNI	WY	375192.	166536.	375.	2.90*	3.60*
ANM SHR	SHERIDAN COUNTY	WY	330111.	167556.	291.	4.02	3.31
ANM RKS	ROCK SPRINGS-SWEETWATER COUNTY	WY	332127.	164702.	314.	3.36	3.30
ANM JAC	JACKSON HOLE	WY	301308.	160165.	280.	3.16	3.07
ANM RNL	RAWLINS MUNI	WY	243696.	146368.	244.	2.07*	2.59*
ANM R1H	RIVERTON REGIONAL	WY	214949.	143896.	203.	2.40	2.38
ANM LAR	GENERAL BRES FIELD	WY	207849.	143611.	190.	2.15	2.34
ANM GEY	SOUTH BIG HORN COUNTY	WY	78587.	131012.	0.	1.31	1.39
ANM EVW	EVANSTON MUNI	WY	60628.	125150.	0.	1.12	1.23
ANM BPI	BIG PINEY MUNI	WY	62842.	108255.	50.	1.29	1.14
ANM DGM	CONVERSE COUNTY	WY	46586.	105878.	0.	0.82	1.01
ANM WRL	WORLAND MUNI	WY	23116.	112907.	0.	0.74	0.90
ANM AFO	AFTON MUNI	WY	24370.	98657.	0.	0.59	0.82
ANM POY	POWELL MUNI	WY	21150.	97503.	0.	0.56	0.79
ANM TOR	TORRINGTON MUNI	WY	28419.	80736.	0.	0.55	0.73
ANM BYG	BUFFALO MUNI	WY	40926.	60042.	57.	1.48	0.67
ANM U68	NORTH BIG HORN COUNTY	WY	21085.	61427.	0.	0.40	0.55
ANM PNA	RALPH WENZ FIELD	WY	22704.	55231.	0.	0.40	0.52
ANM ECS	MONDELL FIELD	WY	29996.	44517.	70.	0.96	0.50
ANM SAA	SHIVELY FIELD	WY	19230.	54290.	0.	0.37	0.49
ANM EAM	PHIFER AIRFIELD	WY	38997.	12728.	0.	0.40	0.34
ANM FBR	FORT BRIDGER	WY	28284.	9019.	27.	0.19*	0.25*
ANM LSK	LUSK MUNI	WY	11653.	18167.	0.	0.17	0.20
ANM THP	HOT SPRINGS CO-THERMOPOLIS MUNI	WY	19668.	6401.	0.	0.20	0.17
ANM EMM	KEMMERER MUNI	WY	13468.	4395.	0.	0.14	0.12
ANM HAD	HARFORD FIELD	WY	11119.	3630.	0.	0.11	0.10
ANM 46U	ALPINE	WY	6403.	2090.	0.	0.06	0.06
ANM U25	DUBOIS	WY	6203.	2024.	0.	0.06	0.05
ANM 79V	EVANS	WY	4977.	1625.	0.	0.05	0.04

SOUTHERN REGION

ASO BFM	BROOKLEY	AL	1125059.	241534.	1135.	7.06*	9.08*
ASO DCU	PRYOR FIELD	AL	848074.	257420.	743.	5.31	7.35
ASO MSL	MUSCLE SHOALS	AL	848344.	245244.	831.	5.60	7.27
ASO ANB	ANNISTON-CALHOUN COUNTY	AL	640729.	207344.	692.	3.19	5.63
ASO 21A	SHELBY COUNTY	AL	541328.	165803.	491.	3.43*	4.70*
ASO GAD	GADSDEN MUNI	AL	437185.	185995.	379.	2.66	4.14
ASO AUD	AUBURN-OPELIKA	AL	375827.	173357.	342.	2.66	3.65
ASO ASM	TALLADEGA MUNI	AL	427894.	96414.	410.	2.85	3.48
ASO TOI	TROY MUNI	AL	405232.	72941.	396.	3.56*	3.18*
ASO 71J	BLACKWELL FIELD	AL	314398.	101285.	277.	2.04	2.76
ASO 39J	MIDDLETON FIELD	AL	290377.	93519.	61.	12.31	2.55
ASO 08A	WETUMPKA MUNI	AL	313436.	63146.	274.	1.95	2.50

ASO	1A8	WALKER COUNTY	JASPER	299822.	51804.	279.	1.74	2.32
ASO	EUF	WEEDON FIELD	EUFULA	279933.	45546.	276.	1.47	2.16
ASO	SCD	LEE MERKLE FLD	SYLACAUGA	253004.	68050.	217.	1.52*	2.13*
ASO	ALX	THOMAS C RUSSELL FLD	ALEXANDER CITY	149109.	134281.	120.	1.47*	1.88*
ASO	12J	BRENTON MUNI	BRENTON	195548.	79953.	137.	3.26	1.83
ASO	M82	HUNTSVILLE AIRPORT NORTH	HUNTSVILLE	197757.	60530.	161.	1.23*	1.72*
ASO	1R8	BAY MINETTE MUNI	BAY MINETTE	195109.	34904.	175.	1.01	1.53
ASO	2A3	BESSEMER	BESSEMER	137208.	59500.	0.	5.24	1.31
ASO	1A9	AUTAUGA COUNTY	PRATTVILLE	106206.	34665.	0.	1.03	0.94
ASO	8A8	ALBERTVILLE MUNI	ALBERTVILLE	116217.	22174.	96.	0.68*	0.92*
ASO	PLR	ST CLAIR COUNTY	PELL CITY	110886.	24963.	66.	1.15*	0.90*
ASO	EDM	ENTERPRISE MUNI	ENTERPRISE	100643.	32858.	0.	0.94	0.89
ASO	4R4	FAIRHOPE MUNI	FAIRHOPE	43111.	61148.	5.	1.78	0.69
ASO	7A2	DEMOPOLIS MUNI	DEMOPOLIS	85963.	15642.	76.	0.49*	0.68*
ASO	SEM	CRAIG FIELD	SELMA	64698.	28111.	0.	0.62	0.62
ASO	HAB	MARION COUNTY	HAMILTON	65479.	18928.	53.	0.57	0.56
ASO	A84	CENTRE MUNI	CENTRE	63133.	11859.	53.	0.46	0.50
ASO	86A	MOTON FIELD	TUSKEGEE	30580.	42033.	12.	0.60	0.48
ASO	3A1	FOLSOM FIELD	CULLMAN	54597.	14296.	171.	1.03	0.46
ASO	1M4	POSEY FIELD	HALEYVILLE	55370.	10889.	44.	0.38	0.44
ASO	PRN	GREENVILLE MUNI	GREENVILLE	44040.	19452.	41.	0.31*	0.42*
ASO	M22	RUSSELLVILLE MUNI	RUSSELLVILLE	44865.	14643.	0.	0.43	0.40
ASO	0R1	ATHORE MUNI	ATHORE	44369.	14483.	0.	0.41	0.39
ASO	79J	ANDALUSIA-OPP	ANDALUSIA & OPP	20786.	23654.	0.	0.27	0.30
ASO	MVC	MONROE COUNTY	MONROEVILLE	36674.	8239.	23.	0.30	0.38
ASO	5M8	ROUNTREE FIELD	HARTSELLE	24992.	17012.	0.	0.27	0.28
ASO	26A	ASHLAND/LINEVILLE	ASHLAND/LINEVILLE	11535.	24745.	0.	0.17	0.24
ASO	8A1	GUNTERSVILLE MUNI	GUNTERSVILLE	16753.	17274.	0.	0.20	0.23
ASO	7A3	LANETT MUNI	LANETT	23824.	7276.	79.	0.52	0.21
ASO	M38	HAZEL GREEN	HAZEL GREEN	21240.	6933.	0.	0.21	0.19
ASO	33J	GENEVA MUNI	GENEVA	16712.	11078.	0.	0.20	0.18
ASO	0J6	HEADLAND MUNI	HEADLAND	19311.	6304.	0.	0.19	0.17
ASO	5R4	FOLEY MUNI	FOLEY	18958.	6188.	0.	0.19	0.17
ASO	28A	ROBBINS FIELD	ONEONTA	16614.	5424.	0.	0.16	0.15
ASO	AL15	JACK EDWARDS	GULF SHORES	16716.	5456.	0.	0.15	0.15
ASO	02A	GRAGG FIELD	CLANTON	16983.	5543.	0.	0.17	0.15
ASO	09A	BUTLER-CHOCTAW COUNTY	BUTLER	15566.	5081.	0.	0.15	0.14
ASO	7A0	GREENSBORO MUNI	GREENSBORO	14367.	4690.	0.	0.14	0.13
ASO	4A9	ISBELL FIELD	FORT PAYNE	12226.	3991.	0.	0.12	0.11
ASO	A1V	GEORGE DOWNER	ALICEVILLE	12286.	4010.	0.	0.12	0.11
ASO	4A6	SCOTTSBORO MUNI	SCOTTSBORO	10904.	3559.	0.	0.11	0.10
ASO	0A8	BIBB COUNTY	CENTREVILLE	11893.	3882.	0.	0.12	0.10
ASO	14J	ELBA MUNI	ELBA	9976.	3256.	0.	0.10	0.09
ASO	AL08	VAIDEN FIELD	MARION	9401.	3069.	0.	0.09	0.08
ASO	M95	RICHARD ARTHUR FIELD	FAYETTE	6790.	5034.	0.	0.08	0.08
ASO	4R3	JACKSON MUNI	JACKSON	7229.	2359.	0.	0.07	0.06
ASO	4R9	DAUPHIN ISLAND	DAUPHIN ISLAND	5667.	1850.	0.	0.05	0.05
ASO	23A	HALLARD	YORK	3963.	1294.	0.	0.04	0.03
ASO	TIX	TITUSVILLE-COcoa	TITUSVILLE	1592981.	346963.	1524.	10.02*	12.89*
ASO	34J	NEW SMYRNA BEACH MUNI	NEW SMYRNA BEACH	1142448.	229706.	1013.	6.45*	9.12*
ASO	81J	DESTIN-FT WALTON BEACH	DESTIN	1139186.	222809.	1412.	7.17*	9.05*
ASO	SF8	SANFORD	SANFORD	947404.	176231.	867.	5.51*	7.47*
ASO	LAL	LAKELAND MUNI	LAKELAND	778472.	227770.	504.	10.93	6.98
ASO	MTH	MARATHON FLIGHT STRIP	MARATHON	734861.	227505.	683.	4.71*	6.39*
ASO	FPR	ST LUCIE COUNTY	FORT PIERCE	677898.	221222.	0.	3.66	5.97
ASO	GIF	WINTER HAVEN'S GILBERT	WINTER HAVEN	682839.	126278.	626.	4.24*	5.38*
ASO	X47	FLAGLER COUNTY	BUNNELL	645748.	126748.	592.	3.84*	5.33*
ASO	SGJ	ST AUGUSTINE	ST AUGUSTINE	645825.	149649.	532.	4.84	5.23
ASO	CEM	BOB SIKES	CRESTVIEW	533884.	101560.	723.	3.02*	4.22*

ASO	OCF	OCALA MUNI /JIM TAYLOR FIELD/	OCALA	419037.	187460.	374.	5.39	4.03
ASO	OMN	MUNICIPAL AIRPORT, ORMOND BEACH	FL	474992.	108607.	396.	4.07	3.88
ASO	LNA	PALM BEACH COUNTY PARK	FL	344749.	187701.	178.	5.96	3.54
ASO	TPF	PETER O KNIGHT	FL	331886.	90357.	275.	4.11	2.81
ASO	APF	NAPLES MUNI	FL	195195.	169066.	0.	8.81	2.42
ASO	COI	MERRITT ISLAND	FL	207236.	136809.	0.	2.19	2.29
ASO	MAI	MARIANNA MUNI	FL	269371.	62583.	319.	1.30	2.21
ASO	VNC	VENICE MUNI	FL	228693.	97978.	0.	2.24	2.17
ASO	BCT	BOCA RATON PUBLIC	FL	181367.	141778.	0.	1.99	2.15
ASO	MYK	MARCO ISLAND	FL	173638.	134398.	166.	1.58*	2.08*
ASO	SUA	WITHAM FIELD	FL	180617.	133059.	0.	1.95	2.08
ASO	X26	SEBASTIAN MUNI	FL	227274.	77005.	0.	2.17	2.02
ASO	X51	HOMESTEAD GENERAL AVIATION	FL	225542.	73620.	0.	2.15	1.99
ASO	X17	PLANT CITY MUNI	FL	204762.	55517.	136.	2.05	1.73
ASO	BKV	HERNANDO COUNTY	FL	181406.	65864.	133.	2.05	1.64
ASO	PGD	CHARLOTTE COUNTY	FL	105108.	139667.	0.	4.65	1.63
ASO	CLW	CLEARWATER EXECUTIVE	FL	178216.	66885.	0.	1.71	1.63
ASO	PHK	PALM BEACH CO GLADES	FL	164075.	73055.	92.	3.12	1.58
ASO	X46	OPA LOCKA WEST	FL	163285.	53301.	0.	1.55	1.44
ASO	DED	DELAND MUNI-SIDNEY H TAYLOR FLD	FL	145860.	65096.	0.	3.93	1.40
ASO	23J	HERLONG	FL	145903.	59295.	0.	1.42	1.36
ASO	ISM	KISSIMMEE MUNI	FL	79836.	122863.	1.	3.24	1.35
ASO	X16	VANDENBERG	FL	144031.	55723.	0.	1.39	1.33
ASO	SEE	SEBRING AIRPORT AND INDUSTRIAL PARK	FL	153315.	45345.	0.	0.66	1.32
ASO	LEE	LEESBURG MUNI	FL	107793.	75985.	0.	1.15	1.22
ASO	X59	VALKARIA	FL	135494.	44234.	0.	0.59	1.19
ASO	68J	TALLAHASSEE COMMERCIAL	FL	134493.	44295.	118.	0.82*	1.19*
ASO	BOW	BARTOW MUNI	FL	98666.	73009.	0.	1.07	1.14
ASO	82J	FERGUSON	FL	113639.	45780.	0.	1.11	1.06
ASO	24J	SUWANNEE COUNTY	FL	27408.	114310.	0.	0.77	0.94
ASO	31J	LAKE CITY MUNI	FL	39254.	94367.	19.	1.52	0.89
ASO	X21	ARTHUR DUNN AIR PARK	FL	72862.	25373.	0.	0.70	0.65
ASO	AVO	AVON PARK MUNI	FL	52050.	31539.	0.	0.54	0.56
ASO	28J	KAY LARKIN	FL	46878.	32784.	0.	0.50	0.53
ASO	55J	FERNANDINA BEACH MUNI	FL	53383.	26110.	0.	0.53	0.53
ASO	2J9	QUINCY MUNI	FL	58290.	21902.	0.	0.56	0.53
ASO	OBE	OKEECHOBEE COUNTY	FL	46289.	26815.	0.	0.47	0.49
ASO	2R4	MILTON T FIELD	FL	50313.	22273.	0.	0.50	0.48
ASO	X07	LAKE WALES MUNI	FL	37521.	35469.	0.	0.43	0.48
ASO	X39	TAMPA DOWNS	FL	42515.	19728.	0.	0.42	0.41
ASO	X06	ARCADIA MUNI	FL	44385.	16269.	0.	0.43	0.40
ASO	IMM	IMMOKALEE	FL	43673.	17132.	0.	0.43	0.40
ASO	X53	CLEWISTON	FL	32308.	16803.	0.	0.31	0.33
ASO	CITY	CROSS CITY	FL	34707.	9761.	26.	0.55	0.30
ASO	X14	LABELLE MUNICIPAL	FL	28076.	14983.	0.	0.28	0.29
ASO	ZPH	ZEPHYRHILLS MUNI	FL	27479.	11870.	0.	0.27	0.26
ASO	40J	PERRY-FOLEY	FL	15277.	22470.	0.	0.70	0.25
ASO	X33	SILVER SPRINGS FLY-N STRIP	FL	25134.	9985.	0.	0.24	0.23
ASO	42J	KEYSTONE AIRPARK	FL	24805.	9296.	0.	0.27	0.23
ASO	X10	BELLE GLADE STATE/MARPT/	FL	24463.	7985.	0.	0.23	0.22
ASO	54J	DEFUNIAK SPRINGS	FL	21594.	8217.	0.	0.21	0.20
ASO	X60	WILLISTON MUNI	FL	18986.	9105.	0.	0.19	0.19
ASO	CDK	GEORGE T LEWIS	FL	18552.	8929.	0.	0.18	0.18
ASO	X01	EVERGLADES	FL	12635.	4123.	0.	0.12	0.11
ASO	01J	HILLIARD AIRPARK	FL	11095.	3621.	0.	0.11	0.10
ASO	0J9	CALHOUN COUNTY	FL	9357.	5929.	0.	0.10	0.10
ASO	X22	WAUCHULA MUNI	FL	10652.	6787.	0.	0.10	0.09
ASO	X13	CARRABELLE FLIGHT STRIP	FL	6787.	2215.	0.	0.06	0.06
ASO	AAF	APALACHICOLA MUNI	FL	5459.	3068.	0.	0.06	0.06
ASO	215	AIRGLADES	FL	2343.	765.	0.	0.02	0.02

ASO	WDR	WINDER	WINDER	408643.	67449.	341.	2.34	3.16
ASO	8A4	MCCOLLUM	MARIETTA	335324.	97184.	956.	6.19	2.87
ASO	SBO	EMANUEL COUNTY	SAWINSBORO	343522.	61878.	288.	1.87*	2.69*
ASO	AMG	BACON COUNTY	ALMA	300431.	52397.	260.	1.71	2.34
ASO	RMG	RICHARD B RUSSELL	ROME	187233.	142301.	137.	2.37	2.19
ASO	DNL	DANIEL FIELD	AUGUSTA	186376.	115569.	158.	1.27*	2.01*
ASO	02J	CRISP COUNTY-CORDELE	CORDELE	246533.	45558.	200.	1.56	1.92
ASO	17A	WINNETT COUNTY	LAURENCEVILLE	220721.	67654.	437.	4.60	1.94
ASO	AYS	WAYCROSS-WARE COUNTY	WAYCROSS	205189.	67606.	172.	1.19*	1.81*
ASO	4A4	CORNELIUS-MOORE FIELD	CEDARTOWN	229544.	39764.	202.	1.33*	1.79*
ASO	BQK	GLYNCO JETPORT	BRUNSWICK	122443.	141056.	0.	1.49	1.75
ASO	LGC	CALLAWAY	LA GRANGE	208997.	39429.	184.	1.24	1.65
ASO	MAC	HERBERT SMART DOWNTOWN	MACON	184622.	58165.	153.	1.08*	1.61*
ASO	PIM	CALLAWAY GARDENS-HARRIS COUNTY	PINE MOUNTAIN	185729.	31923.	170.	1.36	1.45
ASO	TCC	TOCCOA	TOCCO.	168158.	35150.	121.	2.05	1.35
ASO	CCO	NEWMAN COMETA COUNTY	YEMM	155517.	40148.	515.	3.52	1.30
ASO	CTJ	WEST GEORGIA REGIONAL	CARROLLTON	142485.	50292.	362.	4.30	1.28
ASO	VDI	VIDALIA MUNI	VIDALIA	149371.	27214.	123.	0.92	1.17
ASO	GVL	LEE GILMER MEMORIAL	GAINESVILLE	129640.	46494.	12.	3.59	1.17
ASO	MGR	MOULTRIE MUNICIPAL	MOULTRIE	74791.	96950.	222.	1.67	1.14
ASO	DNN	DALTON MUNI	DALTON	96335.	49900.	0.	3.32	0.97
ASO	DBN	DUBLIN MUNI	DUBLIN	115964.	22130.	90.	0.95	0.92
ASO	6A0	CARTERSVILLE	CARTERSVILLE	113105.	24259.	72.	0.75*	0.91*
ASO	2A9	FALCON FLD	PEACHTREE CITY	103062.	27106.	317.	2.12	0.86
ASO	9A1	COVINGTON MUNI	COVINGTON	101542.	27777.	261.	1.92	0.86
ASO	ACJ	SOUTHERN FIELD	AMERICUS	83427.	28618.	0.	0.77	0.74
ASO	TBR	STATESBORO MUNI	STATESBORO	64427.	45594.	0.	1.34	0.73
ASO	9A7	SOUTH EXPRESSWAY	JONESBORO	83154.	27145.	0.	0.77	0.73
ASO	54A	PERRY-FORT VALLEY	PERRY	72690.	23728.	0.	1.75	0.64
ASO	52A	MADISON MUNI	MADISON	76255.	13095.	68.	0.46*	0.59*
ASO	TVI	THOMASVILLE MUNI	THOMASVILLE	67481.	19632.	116.	1.33	0.58
ASO	CZL	TOM B. DAVID FLD	CALHOUN	64646.	21099.	0.	0.59	0.57
ASO	48A	COCHRAN	COCHRAN	45356.	31675.	40.	0.44	0.55
ASO	18J	DOUGLAS MUNI	DOUGLAS	57049.	10044.	49.	0.37	0.45
ASO	2A4	WASHINGTON-WILKES COUNTY	WASHINGTON	49392.	14352.	86.	0.77	0.42
ASO	TMA	HENRY TIFT MYERS	TIFTON	52077.	9064.	46.	0.45*	0.41*
ASO	09J	JEKYLL ISLAND	JEKYLL ISLAND	48912.	13496.	120.	0.81	0.41
ASO	27A	ELBERT COUNTY-PATZ FIELD	ELBERTON	45115.	14729.	0.	0.66	0.40
ASO	CXU	CAMILLA-MITCHELL COUNTY	CAMILLA	34937.	24438.	0.	0.36	0.39
ASO	4J2	BERRIEN CO	NASHVILLE	42726.	13948.	37.	0.39	0.38
ASO	MLJ	BALDWIN COUNTY	MILLEDGEVILLE	48826.	8407.	43.	0.29*	0.38*
ASO	84A	MATHIS	THOMASTON	41757.	13630.	0.	0.38	0.37
ASO	2A2	REGINALD GRANT MEMORIAL	LOUISVILLE	37553.	18463.	0.	0.36	0.37
ASO	2J3	LOUISVILLE MUNICIPAL	BAINBRIDGE	38283.	12496.	0.	1.01	0.34
ASO	46J	COMMODORE-DECATUR	HAZLEHURST	32064.	19692.	0.	0.32	0.34
ASO	75J	TURNER COUNTY	ASHBURN	33741.	17248.	17.	0.25*	0.34*
ASO	70J	CAIRO-GRADY COUNTY	CAIRO	37116.	12115.	0.	1.12	0.33
ASO	50A	HABERSHAM COUNTY	CORNELIA	32547.	10624.	0.	0.30	0.29
ASO	16J	DAWSON MUNI	DAWSON	33045.	10787.	0.	0.78	0.29*
ASO	FZG	FITZGERALD MUNI	FITZGERALD	37024.	6847.	30.	0.20*	0.29*
ASO	07J	EASTMAN-DODGE COUNTY	EASTMAN	29260.	9552.	0.	0.27	0.26
ASO	2J7	BURKE COUNTY	WAYNESBORO	28200.	9206.	0.	0.26	0.25
ASO	8A9	SOUTH FULTON SKY PORT	FAIRBURN	28468.	9294.	0.	0.27	0.25
ASO	5A2	WARNER ROBINS AIRPARK	WARNER ROBINS	26087.	8514.	0.	0.24	0.23
ASO	15J	COOK COUNTY	ADEL	25003.	8160.	0.	0.23	0.22
ASO	4J6	ST MARYS	ST MARYS	24577.	8022.	0.	0.23	0.22
ASO	11J	EARLY COUNTY	BLAKELY	24491.	7993.	0.	1.06	0.22
ASO	30J	BAXLEY MUNI	BAXLEY					

ASO	A06	MONROE MUNI	MONROE	7448.	22818.	0.	0.21	0.20
ASO	46A	BLAIRSVILLE	BLAIRSVILLE	7059.	21626.	0.	0.20	0.19
ASO	SYV	SYLVESTER	SYLVESTER	6695.	20506.	0.	0.19	0.18
ASO	6A2	GRIFFIN-SPALDING COUNTY	GRIFFIN	6756.	20695.	0.	0.19	0.18
ASO	53A	MONTEZUMA MUNI	MONTEZUMA	6685.	20581.	0.	0.19	0.18
ASO	17J	DONALSONVILLE MUNI	DONALSONVILLE	6446.	19748.	0.	0.18	0.17
ASO	2J2	LIBERTY COUNTY	HINESVILLE	14201.	11338.	0.	0.14	0.17
ASO	MQM	TELFAIR-WHEELER	MCRAE	4598.	19518.	10.	0.15	0.16
ASO	4J5	QUITMAN BROOKS COUNTY	QUITMAN	5971.	18288.	0.	0.17	0.16
ASO	65J	WRENS MEMORIAL	WRENS	4775.	14629.	0.	0.13	0.13
ASO	BGE	DECATUR COUNTY INDUSTRIAL AIR PARK	BAINBRIDGE	4879.	14950.	0.	0.15	0.13
ASO	56J	PLANTATION ARPK	SYLVANIA	4697.	14339.	0.	0.13	0.13
ASO	19A	JACKSON COUNTY	JEFFERSON	4535.	13895.	0.	0.13	0.12
ASO	2J4	METTER MUNI	METTER	4218.	12922.	0.	0.12	0.11
ASO	5A9	ROOSEVELT MEMORIAL	WARM SPRINGS	4139.	12679.	0.	0.12	0.11
ASO	6A1	BUTLER MUNI	BUTLER	3771.	11550.	0.	0.11	0.10
ASO	19J	HOMERVILLE	HOMERVILLE	3692.	11313.	0.	0.10	0.10
ASO	9A5	BARWICK LAFAYETTE	LAFAYETTE	3597.	11019.	0.	0.10	0.10
ASO	RVJ	REIDSVILLE	REIDSVILLE	3421.	10483.	0.	0.09	0.09
ASO	2J1	CLAXTON-EVANS COUNTY	CLAXTON	2817.	8633.	0.	0.08	0.08
ASO	18A	FRANKLIN COUNTY	CANON	1766.	5411.	0.	0.05	0.05
ASO	2J5	MILLEN	MILLEN	1966.	6024.	0.	0.06	0.05
ASO	25J	CUTHBERT-RANDOLPH	CUTHBERT	1790.	5484.	0.	0.05	0.05
ASO	4J1	BRANTLEY COUNTY	NAHANTA	1989.	6094.	0.	0.06	0.05
ASO	47A	CHEROKEE COUNTY	CANTON	1573.	4810.	0.	0.04	0.04
ASO	49A	GILMER COUNTY	ELLIJAY	1035.	3170.	0.	0.03	0.03
ASO	JES	JESUP-WAYNE COUNTY	JESUP	828.	2535.	0.	0.07	0.02

ASO	LOZ	LONDON-CORBIN ARPT-MAGEE FLD	LONDON	313811.	1363390.	1320.	8.20	11.14
ASO	FFT	CAPITAL CITY	FRANKFORT	288060.	1013889.	918.	9.72	8.65
ASO	126	HENDERSON CITY-COUNTY	HENDERSON	103273.	287105.	249.	1.77*	2.59*
ASO	BWG	BOWLING GREEN-WARREN COUNTY	BOWLING GREEN	144266.	202625.	159.	1.76	2.30
ASO	019	BEN FLOYD FIELD	ELIZABETHTOWN	197.	211288.	197.	1.62*	2.17*
ASO	210	MADISONVILLE MUNI	MADISONVILLE	122064.	185268.	172.	1.50	2.04
ASO	GLW	GLASGOW MUNI	GLASGOW	109391.	174992.	152.	1.49	1.89
ASO	016	TAYLOR COUNTY	CAMPBELLSVILLE	116644.	149409.	136.	1.22*	1.77*
ASO	SME	SOMERSET-PULASKI COUNTY	SOMERSET	74300.	84109.	0.	3.65	1.02
ASO	131	GOODALL FIELD	DANVILLE	117120.	36024.	0.	0.85	1.02
ASO	510	PIKEVILLE-PIKE COUNTY	PIKEVILLE	96202.	44321.	0.	0.69	0.93
ASO	1A6	MIDDLESBORO-BELL COUNTY	MIDDLESBORO	88374.	24837.	0.	0.49	0.75
ASO	6M5	HANCOCK AIRFIELD	HAWESVILLE	15769.	90954.	83.	0.54*	0.71*
ASO	137	HAZARD	HAZARD	68011.	33443.	0.	0.49	0.67
ASO	128	ASHLAND-BOYD COUNTY	ASHLAND	31494.	50599.	92.	0.97	0.55
ASO	1M8	HOPKINSVILLE-CHRISTIAN COUNTY	HOPKINSVILLE	50540.	31076.	0.	0.42	0.54
ASO	BRY	SAMUELS FIELD	BARDSTOWN	63749.	16186.	0.	0.77	0.53
ASO	FGX	FLEMING-MASON	FLEMINGSBURG	39007.	30189.	0.	1.27	0.46
ASO	013	MT STERLING-MONTGOMERY COUNTY	MOUNT STERLING	43817.	17960.	0.	0.29	0.41
ASO	M25	MAYFIELD GRAVES COUNTY	MAYFIELD	35358.	23392.	70.	0.53	0.39
ASO	4M7	RUSSELLVILLE-LOGAN COUNTY	RUSSELLVILLE	18952.	39851.	139.	1.06	0.39
ASO	316	PAINTSVILLE-PRESTONSBURG-COMBS FIELD	PAINTSVILLE	12946.	34209.	0.	0.33	0.31
ASO	M21	MUHLENBERG COUNTY	GREENVILLE	17687.	27591.	0.	0.95	0.30
ASO	M34	KENTUCKY DAM STATE PARK	GILBERTSVILLE	14237.	31512.	0.	0.30	0.28
ASO	018	CYNTHIANA-HARRISON COUNTY	CYNTHIANA	17775.	25467.	0.	0.21	0.26
ASO	BRG	WHITESBURG MUNI	WHITESBURG	18698.	17083.	0.	0.20	0.23
ASO	I35	TUCKER-GUTHRIE MEMORIAL	HARLAN	9515.	17815.	83.	0.57	0.22
ASO	I39	MADISON	RICHMOND	12632.	24620.	0.	0.85	0.22
ASO	CEY	MURRAY-CALLOWAY COUNTY	MURRAY	9528.	20550.	0.	0.20	0.20
ASO	910	WAYNE COUNTY	MONTICELLO	7209.	20238.	0.	0.22	0.19
ASO	I05	STURGIS MUNI	STURGIS	6817.	22083.	0.	0.22	0.18
ASO	I32	MOREHEAD-ROWAN COUNTY	MOREHEAD		20887.	0.	0.20	

ASO	IM7	FULTON	FULTON	18264.	5961.	0.	0.17	0.16
ASO	I50	STANTON	STANTON	16996.	6178.	0.	0.16	0.15
ASO	I30	BEREA-RICHMOND	BEREA	14708.	6491.	0.	0.15	0.14
ASO	2M0	PRINCETON-CALDWELL COUNTY	PRINCETON	13008.	4245.	0.	0.12	0.11
ASO	I33	MARSHALL FLD	GEORGETOWN	5550.	9431.	0.	0.03	0.10
ASO	I49	ARNOLDS	SPRINGFIELD	9426.	3077.	0.	0.09	0.08
ASO	I93	BRECKINRIDGE COUNTY	HARDINSBURG	8111.	2647.	0.	0.03	0.07
ASO	511	BOSS	BURNSIDE	6507.	2124.	0.	0.06	0.06
ASO	KY07	BLUE LICK	LOUISVILLE	2149.	702.	0.	0.02	0.02
ASO	MBO	BRUCE CAMPBELL FIELD	MADISON	802016.	213337.	645.	5.04	6.75
ASO	HBG	HATTIESBURG MUNI	HATTIESBURG	707197.	126511.	529.	4.87	5.54
ASO	TUP	C.D. LEMONS MUNI	TUPELO	586576.	206777.	509.	4.08	5.27
ASO	OLV	OLIVE BRANCH	OLIVE BRANCH	588775.	157627.	502.	3.58	4.96
ASO	PGL	JACKSON COUNTY	PASCAGOULA	605588.	108536.	514.	3.57	4.74
ASO	HEZ	HARDY-ANCERS FIELD	NATCHEZ	407921.	174117.	367.	2.29	3.87
ASO	PIB	PINE BELT REGIONAL	LAUREL/HATTIESBURG	364959.	164447.	345.	2.11	3.52
ASO	LUL	HESLER-NOBLE FIELD	LAUREL	408045.	68989.	365.	1.91	3.17
ASO	GWO	GREENWOOD-LEFLORE	GREENWOOD	335159.	119789.	303.	2.31	3.02
ASO	VKS	VICKSBURG MUNI	VICKSBURG	356211.	61632.	316.	2.10	2.78
ASO	RNV	CLEVELAND MUNI	CLEVELAND	276033.	48266.	241.	2.10	2.15
ASO	MCB	MCCOMB-PIKE COUNTY	MC COMB	274228.	47838.	254.	1.44	2.14
ASO	CKM	FLETCHER FIELD	CLARKSDALE	238096.	42545.	203.	2.01	1.86
ASO	IR7	BROOKHAVEN-LINCOLN COUNTY	BROOKHAVEN	155283.	26563.	139.	1.05	1.21
ASO	UOX	UNIVERSITY-OXFORD	OXFORD	57019.	109298.	0.	2.12	1.11
ASO	GTR	GOLDEN TRIANGLE REGIONAL	COLUMBUS/W POINT/STARK	45432.	120192.	0.	0.92	1.10
ASO	CRX	ROSCOE TURNER	CORINTH	127576.	24294.	100.	1.31	1.01
ASO	IDL	INDIANOLA MUNICIPAL	INDIANOLA	125098.	23219.	101.	0.76	0.99
ASO	5R2	GULFPARK	OCEAN SPRINGS	89836.	23446.	285.	1.78	0.75
ASO	M16	JOHN BELL WILLIAMS	RAYMOND	70318.	13729.	60.	0.65	0.62
ASO	M37	RULEVILLE-DREW	DREW	74263.	1729.	0.	0.41	0.58
ASO	LMS	LOUISVILLE WINSTON COUNTY	LOUISVILLE	68326.	12681.	56.	0.68	0.54
ASO	3R6	STENNIS INTERNATIONAL	BAY ST LOUIS	57734.	18842.	0.	2.40	0.51
ASO	PCU	PICAYUNE PEARL RIVER COUNTY	PICAYUNE	64506.	11407.	56.	0.36	0.50
ASO	2M7	DESOTO AIRPARK	HORN LAKE	24127.	49507.	0.	0.34	0.49
ASO	2M6	TWINKLE TOWN	WALLS	61732.	10770.	0.	0.10	0.48
ASO	OR0	COLUMBIA-MARION COUNTY	COLUMBIA	52021.	16980.	0.	1.56	0.46
ASO	UBS	COLUMBUS-LOWNDES COUNTY	COLUMBUS	51599.	16839.	0.	0.47	0.45
ASO	OSX	KOSCIUSKO-ATTALA COUNTY	KOSCIUSKO	49709.	9226.	40.	0.49	0.39
ASO	STF	GEORGE M BRYAN	STARKVILLE	43216.	14107.	0.	0.40	0.38
ASO	M40	MONROE COUNTY	ABERDEEN/AMORY	36667.	11966.	0.	0.34	0.32
ASO	M41	HOLLY SPRINGS-MARSHALL COUNTY	HOLLY SPRINGS	40779.	7648.	33.	0.28	0.32
ASO	M42	GRENADA MUNI	GRENADA	34681.	11320.	0.	0.32	0.31
ASO	22M	PONTOTOC COUNTY	PONTOTOC	30174.	9850.	0.	0.28	0.27
ASO	20M	MACON MUNI	MACON	30039.	9805.	0.	0.28	0.26
ASO	25M	RIPLEY	RIPLEY	33811.	5840.	30.	0.20	0.26
ASO	M23	OKEEFE FIELD	NEWTON	28837.	9411.	0.	0.26	0.25
ASO	1M2	BELZONI MUNI	BELZONI	25415.	7200.	53.	0.42	0.22
ASO	14M	HOLLANDALE MUNI	HOLLANDALE	24407.	7967.	0.	0.23	0.22
ASO	M506	DEAN GRIFFIN MEMORIAL	WIGGINS	23952.	7817.	0.	0.22	0.21
ASO	M72	NEW ALBANY-UNION CO	NEW ALBANY	19796.	6460.	0.	0.18	0.17
ASO	M68	DORR FIELD	MERIGOLD	14873.	4854.	0.	0.14	0.13
ASO	8M1	BOONEVILLE-BALDWIN	BOONEVILLE-BALDWIN	13638.	4451.	0.	0.12	0.12
ASO	0M6	PANOLA COUNTY	BATESVILLE	12082.	3944.	0.	0.11	0.11
ASO	M83	MCCHAREN FIELD	WEST POINT	10991.	3588.	0.	0.10	0.10
ASO	M44	HOUSTON MUNI	HOUSTON	11369.	3710.	0.	0.10	0.10
ASO	M17	PHILADELPHIA MUNI	PHILADELPHIA	10991.	3588.	0.	0.10	0.10
ASO	3A8	STINSON FIELD MUNI	ABERDEEN	11306.	3690.	0.	0.10	0.10
ASO	08M	CARTHAGE-LEAKE COUNTY	CARTHAGE	8970.	2927.	0.	0.08	0.08
ASO	5A6	WINONA-MONTGOMERY COUNTY	WINONA	9092.	2967.	0.	0.08	0.08

ASO 07M	HASTING AIRPARK	BRUCE	9488.	3097.	0.	0.09	0.08
ASO M51	OKTIBBEHA	STARXVILLE	9520.	3107.	0.	0.09	0.08
ASO M504	PRENTISS-JEFFERSON DAVIS COUNTY	PRENTISS	8056.	2630.	0.	0.07	0.07
ASO 01M	TISHOMINGO COUNTY	BELMONT	6444.	2103.	0.	0.06	0.06
ASO 2M4	FOREST MUNI	FOREST	4544.	1483.	0.	0.04	0.04
ASO T36	TYLERTOWN	TYLERTOWN	2293.	748.	0.	0.02	0.02
ASO 4R1	I H BASS JR MEMORIAL	LUMBERTON	1516.	495.	0.	0.01	0.01
ASO LBT	LUMBERTON MUNI	LUMBERTON	651670.	108557.	630.	3.74	5.05
ASO MEB	LAURINBURG-MAXTON	MAXTON	498365.	190100.	489.	3.42	4.57
ASO W03	WILSON MUNI	WILSON	519175.	101491.	477.	3.29*	4.12*
ASO 0CW	WARREN FIELD	WASHINGTON	466840.	105985.	419.	2.83*	3.81*
ASO EQY	MONROE	MONROE	376893.	162498.	340.	2.12	3.58
ASO RWI	ROCKY MOUNT-WILSON	ROCKY MOUNT	346352.	161248.	340.	2.12	3.37
ASO BUY	BURLINGTON MUNI	BURLINGTON	335908.	94152.	271.	2.22	2.86
ASO ECG	ELIZABETH CITY MUNI	ELIZABETH CITY	357893.	58667.	349.	1.61*	2.77*
ASO 0A6	GASTONIA MUNI	GASTONIA	284039.	129322.	202.	1.94*	2.75*
ASO MRH	BEAUFORT-MOREHEAD CITY	BEAUFORT	343139.	59979.	0.	0.61	2.68
ASO MRN	MORGANTON-LENOIR	MORGANTON	231282.	144233.	201.	1.65	2.50
ASO RZZ	HALIFAX COUNTY	ROANOKE RAPIDS	201746.	142868.	203.	2.19	2.29
ASO 45J	ROCKINGHAM-HAMLET	ROCKINGHAM	268658.	64406.	243.	1.61	2.21
ASO EDE	EDENTON MUNI	EDENTON	238111.	70835.	220.	1.60	2.05
ASO W77	SANFORD-LEE COUNTY BRICK FIELD	SANFORD	252071.	45017.	229.	1.39	1.97
ASO ASJ	TRI-COUNTY	SHOSKIE	190695.	80479.	176.	1.42*	1.80*
ASO SOP	PINEHURST-SOUTHERN PINES	SOUTHERN PINES	124787.	142921.	2.	5.37	1.78
ASO W44	ASHEBORO MUNI	ASHEBORO	203020.	35924.	181.	1.16*	1.59*
ASO CTZ	SAMPSON COUNTY	CLINTON	111813.	106067.	82.	1.07	1.45
ASO PGV	PITT-GREENVILLE	GREENVILLE	73772.	129419.	1.	3.44	1.35
ASO W52	HORACE WILLIAMS	CHAPEL HILL	142918.	32113.	124.	0.82*	1.16*
ASO 0AU	ALBERT J ELLIS	JACKSONVILLE	43252.	119480.	0.	0.94	1.08
ASO RUQ	ROMAN COUNTY	SALISBURY	111282.	48423.	289.	1.97	1.06
ASO GW4	GOLDSBORO-WAYNE MUNI	GOLDSBORO	63635.	80847.	0.	2.03	0.96
ASO 8W5	BILLY MITCHELL	HATTERAS	96620.	22221.	88.	0.79*	0.79*
ASO CPC	COLUMBUS COUNTY MUNICIPAL	WHITEVILLE	41446.	73603.	0.	0.58	0.76
ASO 3A3	ANSON COUNTY	WADESBORO	21055.	90176.	0.	0.47	0.74
ASO SVH	STATESVILLE MUNI	STATESVILLE	60583.	37824.	0.	1.82	0.65
ASO 1A5	MACON COUNTY	FRANKLIN	23328.	67691.	0.	0.41	0.60
ASO 6A3	ANDREWS-MURPHY	ANDREWS	44087.	44511.	0.	0.51	0.59
ASO IKB	WILKES COUNTY	WILKESBORO	35179.	41604.	0.	0.97	0.51
ASO MQI	MANTEO	MANTEO	49815.	25296.	1.	1.05	0.50
ASO 57A	RUTHERFORD COUNTY	RUTHERFORDTON	53993.	17620.	0.	2.36	0.48
ASO 4W8	HENDERSON-OXFORD	OXFORD	53101.	17332.	0.	1.74	0.47*
ASO W46	ERWIN	ERWIN	58591.	12141.	41.	0.35*	0.47*
ASO MWK	MT AIRY-SURRY COUNTY	MT AIRY	37557.	27745.	0.	0.40	0.43
ASO 24A	JACKSON COUNTY	SYLVA	18331.	44698.	0.	0.29	0.42
ASO W27	JOHNSTON COUNTY	SMITHFIELD	45217.	14761.	0.	1.02	0.40
ASO 0A7	HENDERSONVILLE-WINKLER	HENDERSONVILLE	40795.	19405.	0.	0.41	0.40
ASO MCZ	MARTIN COUNTY	WILLIAMSTON	20553.	36828.	0.	0.29	0.38
ASO 4A8	ALBEMARLE	ALBEMARLE	16051.	37500.	0.	0.25	0.36
ASO PMZ	PLYMOUTH MUNICIPAL	PLYMOUTH	35807.	11689.	0.	0.77	0.32
ASO SUT	BRUNSWICK COUNTY	SOUTHPORT	39070.	6717.	36.	0.31*	0.30*
ASO ACZ	HENDERSON FIELD	WALLACE	25059.	20214.	0.	0.28	0.30
ASO ZEF	ELKIN MUNI	ELKIN	28313.	9241.	0.	0.89	0.25
ASO DPL	P. B. RAIFORD	KENANSVILLE	28790.	9397.	0.	1.07	0.25
ASO W40	MT OLIVE MUNI	MT OLIVE	21737.	13187.	0.	0.35	0.23
ASO W95	OCRACOKE ISLAND	OCRACOKE	25026.	8167.	0.	0.24	0.22
ASO LFN	FRANKLIN COUNTY	LOUISBURG	24539.	8011.	0.	0.23	0.22
ASO 43A	MONTGOMERY COUNTY	STAR	19735.	6441.	0.	0.19	0.17
ASO 5W4	RAEFORD MUNI	RAEFORD	15473.	5051.	0.	0.25	0.14
ASO EXX	LEXINGTON MUNI	LEXINGTON	12004.	3283.	31.	0.20	0.10

ASO	FFA	FIRST FLIGHT	NC	6894.	8340.	0.	0.08	0.10
ASO	NC16	HIATT	NC	11398.	3721.	0.	0.11	0.10
ASO	5W8	SILER CITY MUNI	NC	8639.	2820.	0.	0.08	0.08
ASO	6A6	STANLY COUNTY	NC	7437.	2427.	0.	0.07	0.07
ASO	7A8	AVERY COUNTY/MORRISON FIELD/	NC	6715.	2191.	0.	0.06	0.06
ASO	NC67	ASHE COUNTY	NC	5515.	1800.	0.	0.05	0.05
ASO	BQN	BORINQUEN	PR	113053.	142269.	0.	1.68	1.70
ASO	X63	HUMACAO	PR	17968.	111227.	0.	0.69	0.86
ASO	VQS	VIEQUES	PR	7731.	107887.	0.	0.58	0.77
ASO	CPX	CULEBRA /RESTRICTED/	PR	7002.	105232.	0.	0.52	0.75
ASO	ABO	ARECIBO AIRFIELD	PR	18954.	6185.	0.	0.19	0.17
ASO	49J	HILTON HEAD	SC	942575.	264348.	823.	7.25*	8.02*
ASO	GRD	GREENWOOD COUNTY	SC	362261.	160295.	312.	2.84	3.47
ASO	CEU	CLEMSON-GOONEE COUNTY	SC	373202.	137950.	326.	2.31*	3.40*
ASO	CUB	OWENS FIELD	SC	297272.	169969.	0.	2.95	3.10
ASO	CDN	WOODWARD FIELD	SC	321520.	88852.	278.	2.35	2.73
ASO	BNL	BARNWELL COUNTY	SC	209680.	101070.	175.	1.31*	2.06*
ASO	88J	ALLENDALE COUNTY	SC	217536.	81515.	161.	1.33*	1.99*
ASO	AND	ANDERSON COUNTY	SC	102673.	117682.	0.	1.21	1.46
ASO	61J	J.E. LOCKLAIR MEMORIAL	SC	93832.	114798.	0.	1.13	1.39
ASO	J2I	JOHNS ISLAND	SC	74605.	120703.	0.	2.68	1.30
ASO	29J	BRYANT FIELD	SC	104275.	85511.	0.	2.57	1.26
ASO	SMS	SUMTER MUNI	SC	91919.	93226.	0.	1.02	1.23
ASO	RBW	WALTERBORO MUNI	SC	144779.	32449.	122.	1.04	1.18
ASO	MAO	MARION COUNTY	SC	143868.	29686.	126.	0.92	1.15
ASO	27J	NEWBERRY MUNI	SC	136679.	24061.	118.	0.77*	1.07*
ASO	50J	BERKELEY COUNTY	SC	33039.	116147.	0.	0.81	0.99
ASO	04J	DARLINGTON MUNI	SC	113418.	33681.	110.	0.64*	0.98*
ASO	9A6	CHESTER COUNTY	SC	115086.	27925.	70.	0.75	0.95
ASO	HVS	HARTSVILLE MUNI	SC	94943.	19023.	69.	0.77	0.76
ASO	47J	CHERAW MUNI	SC	76594.	32241.	51.	0.52	0.72
ASO	FDW	FAIRFIELD COUNTY	SC	58600.	37527.	48.	0.44*	0.64*
ASO	AIK	AIKEN MUNI	SC	34765.	56477.	0.	0.45	0.61
ASO	LQK	PICKENS COUNTY	SC	64410.	24277.	0.	1.70	0.59
ASO	HYW	CONWAY-HORRY COUNTY	SC	52364.	36441.	0.	1.26	0.59
ASO	GGE	GEORGETOWN COUNTY	SC	19137.	63837.	0.	0.33	0.55
ASO	0GB	ORANGEBURG	SC	49186.	18345.	0.	1.24	0.45
ASO	58J	HUGGINS	SC	42788.	8229.	33.	0.24*	0.34*
ASO	35A	UNION COUNTY	SC	12168.	36153.	0.	0.20	0.32
ASO	CKI	WILLIAMSBURG COUNTY	SC	35488.	11583.	0.	1.08	0.31
ASO	DLC	DILLON COUNTY	SC	30798.	10052.	0.	0.28	0.27
ASO	73J	BEAUFORT COUNTY	SC	9183.	30089.	0.	0.16	0.26
ASO	34A	LAURENS COUNTY	SC	20883.	13276.	0.	0.21	0.23
ASO	LKR	LANCASTER COUNTY	SC	19702.	6432.	0.	0.43	0.17
ASO	B8P	MARLBORO COUNTY	SC	12836.	6994.	0.	0.12	0.13
ASO	5J9	TWIN CITY	SC	12375.	4040.	0.	0.24	0.11
ASO	3J1	RIDGELAND MUNI	SC	11353.	3706.	0.	0.11	0.10
ASO	35J	PAGELAND	SC	4752.	1551.	0.	0.04	0.04
ASO	52J	BISHOPVILLE MUNI	SC	1641.	824.	0.	0.02	0.02
ASO	CSV	CROSSVILLE MEMORIAL	TN	1270273.	226335.	1230.	7.66	9.94
ASO	MKL	MCKELLAR FIELD	TN	534892.	195652.	499.	3.58	4.85
ASO	SYI	BOMAR FLD-SHELBYVILLE MUNI	TN	506581.	104907.	468.	3.38	4.06
ASO	THA	WILLIAM NORTHERN FIELD	TN	364592.	71800.	320.	2.64	3.03
ASO	MOR	MOORE-MURRELL	TN	277516.	73473.	173.	6.35	2.33
ASO	CKV	OUTLAW FIELD	TN	109558.	141123.	0.	1.55	1.67
ASO	SRB	SPARTA-WHITE COUNTY	TN	126698.	83059.	106.	1.08	1.39
ASO	PHT	HENRY COUNTY	TN	69480.	127998.	2.	3.38	1.31

ASO	2M8	CHARLES W. BAKER	MILLINGTON	119803.	68883.	0.	1.23	1.25
ASO	GCB	GREENEVILLE MUNI	GREENEVILLE	74466.	107117.	1.	3.17	1.21
ASO	UCY	EVERETT-STEWART	UNION CITY	72060.	106703.	0.	2.23	1.19
ASO	TGC	GIBSON COUNTY	TRENTON	134205.	24250.	117.	1.03	1.05
ASO	JAG	SEVIER-GATLINBURG	SEVIERVILLE	61679.	90475.	0.	2.77	1.01
ASO	GHM	CENTERVILLE MUNI	CENTERVILLE	55839.	93356.	48.	0.64	0.99
ASO	M52	FRANKLIN WILKINS	LEXINGTON	121474.	21358.	109.	0.84	0.95
ASO	0A9	ELIZABETHTON MUNI	ELIZABETHTON	78766.	55495.	0.	0.85	0.89
ASO	0A7	MURFREESBORO MUNI	MURFREESBORO	98429.	32134.	0.	1.56	0.86
ASO	DBT	DYERSBURG MUNI	DYERSBURG	53193.	76289.	0.	1.92	0.86
ASO	M01	GENERAL DEWITT SPAIN	MEMPHIS	89115.	29757.	0.	0.85	0.79
ASO	M88	CORNELIA FORT AIRPARK	NASHVILLE	89137.	29099.	0.	0.86	0.79
ASO	HDI	HARDWICK FIELD	CLEVELAND	68531.	49483.	0.	1.97	0.78
ASO	M54	LEBANON MUNI	LEBANON	39085.	75164.	0.	1.58	0.76
ASO	0M4	BENTON COUNTY	CAMDEN	23098.	90720.	0.	1.11	0.76
ASO	CJE	PUTNAM COUNTY	COOKEVILLE	48984.	63579.	0.	1.26	0.75
ASO	SNH	SAVANNAH-HARDIN COUNTY	SAVANNAH	34949.	70913.	0.	1.38	0.70
ASO	0M5	HUMPHREYS COUNTY	WAVENLY	24872.	78464.	0.	0.87	0.69
ASO	MRC	MAURY COUNTY	COLUMBIA/MT PLEASANT	45382.	50562.	0.	1.54	0.64
ASO	1M5	PORTLAND MUNICIPAL	PORTLAND	36424.	59477.	0.	1.32	0.64
ASO	M33	GALLATIN MUNI	GALLATIN	34631.	58893.	0.	0.98	0.62
ASO	SZY	ROBERT SIBLEY	SELMER	25826.	67935.	0.	1.16	0.62
ASO	MMI	MCMINN COUNTY	ATHENS	51106.	40417.	0.	2.01	0.61
ASO	RNC	WARREN COUNTY MEMORIAL	MCMINNVILLE	36252.	54677.	0.	1.23	0.60
ASO	2A0	MARK ANTON	DAYTON	33762.	52676.	0.	1.31	0.57
ASO	M08	BOLIVAR-HARDEMAN COUNTY	BOLIVAR	55782.	24128.	0.	0.55	0.53
ASO	LHC	ARLINGTON MUNI	ARLINGTON	53347.	23338.	0.	1.08	0.51
ASO	M04	COVINGTON MUNI	COVINGTON	31514.	18543.	0.	1.53	0.50
ASO	BGF	WINCHESTER MUNI	WINCHESTER	31514.	40068.	0.	1.39	0.48
ASO	FYM	FAYETTEVILLE MUNI	FAYETTEVILLE	36759.	29820.	0.	0.98	0.41
ASO	JAU	CAMPBELL COUNTY	JACKSBORO	32988.	28590.	0.	0.40	0.41
ASO	M91	SPRINGFIELD MUNI	SPRINGFIELD	38448.	22977.	0.	1.27	0.39
ASO	RKW	ROCKWOOD MUNI	ROCKWOOD	30272.	27702.	0.	1.35	0.36
ASO	M53	HUMBOLDT MUNI	HUMBOLDT	35925.	17586.	3.	0.64	0.35
ASO	APT	MARION COUNTY-BROWN FLD	JASPER	18962.	33007.	0.	0.96	0.34
ASO	LUG	ELLINGTON	LEWISBURG	29464.	21456.	0.	0.78	0.32
ASO	RVN	HAWKINS COUNTY	ROGERSVILLE	25046.	23012.	0.	0.28	0.26
ASO	MNV	MONROE COUNTY	MADISONVILLE	29181.	9524.	0.	0.27	0.25
ASO	0M1	SCOTT FIELD	PARSONS	28776.	9391.	24.	0.16*	0.22*
ASO	M29	HASSELL FIELD	CLIFTON	27556.	5025.	0.	0.22	0.21
ASO	8A3	LIVINGSTON MUNI	LIVINGSTON	23396.	7636.	0.	0.58	0.19
ASO	M02	DICKSON MUNI	DICKSON	20734.	8548.	0.	0.19	0.17
ASO	3A2	TAZEWELL'S-CLAIBORNE COUNTY	TAZEWELL	19788.	6458.	0.	0.18	0.17
ASO	GZ5	ABERNATHY FIELD	PULASKI	19834.	6473.	0.	0.17	0.16
ASO	2M2	LAWRENCEBURG MUNI	LAWRENCEBURG	18669.	7613.	0.	0.14	0.16
ASO	2A1	JAMESTOWN MUNI	JAMESTOWN	17944.	5857.	0.	0.16	0.15
ASO	1A3	MARTIN CAMPBELL FIELD	COPPERHILL	12911.	10788.	0.	0.11	0.14
ASO	3M7	LAFAYETTE MUNICIPAL	LAFAYETTE	16770.	5474.	0.	0.13	0.12
ASO	U05	FRANKLIN COUNTY	SEWANEE	7505.	14289.	0.	0.08	0.08
ASO	6A4	JOHNSON COUNTY	MOUNTAIN CITY	13524.	5250.	0.	0.02	0.02
ASO	0M2	REELFOOT LAKE	TIPTONVILLE	8914.	3194.	0.	0.00	0.00
ASO	1A7	JACKSON COUNTY	GAINESBORO	1958.	639.	0.	0.00	0.00
ASO	SCX	SCOTT MUNI	ONEIDA	162.	49.	0.	0.00	0.00

SOUTHWEST REGION

ASW JBR JONESBORO MUNI
ASW IM1 NORTH LITTLE ROCK MUNI

JONESBORO
NORTH LITTLE ROCK

AR AR
1656932. 386449. 1420. 10.81 13.58
730429. 161124. 621. 4.57 5.92

ASW	ARG	WALNUT RIDGE REGIONAL	WALNUT RIDGE	596366.	181540.	531.	4.02	5.17
ASW	H37	SPRINGDALE MUNI	FLIPPING	535617.	216444.	363.	8.33	5.00
ASW	FLP	MARION COUNTY REGIONAL	FLIPPING	551246.	200482.	479.	3.50*	4.99*
ASW	M39	MENA MUNICIPAL	MENA	439545.	179402.	384.	3.53*	4.11*
ASW	H00	BENTONVILLE MUN	BENTONVILLE	334906.	163552.	288.	2.27*	3.31*
ASW	2M9	MOUNTAIN HOME MUNI	MOUNTAIN HOME	317669.	159707.	277.	2.20*	3.17*
ASW	M07	SEARCY MUNI	SEARCY	313710.	153082.	277.	2.25*	3.10*
ASW	H82	HEBER SPRINGS MUNI	HEBER SPRINGS	358907.	62347.	313.	2.05*	2.80*
ASW	PGR	PARAGOULD MUNI	PARAGOULD	238937.	128297.	186.	2.65	2.44
ASW	CDH	HARRELL FIELD	CAMDEN	190788.	116789.	161.	1.75	2.04
ASW	SGT	STUTTGART MUNI	STUTTGART	241684.	48061.	194.	1.42	1.93
ASW	M06	RUSSELLVILLE MUNI	RUSSELLVILLE	167971.	98940.	165.	1.23*	1.91*
ASW	M76	MONTECELLO MUNICIPAL	MONTECELLO	231777.	47951.	197.	1.29*	1.86*
ASW	M03	CONWAY MUNI	CONWAY	209028.	41434.	185.	1.31*	1.66*
ASW	HKA	BLITHEVILLE MUNI	BLITHEVILLE	99668.	121596.	0.	1.21	1.47
ASW	M18	HOPE MUNICIPAL	HOPE	139599.	73848.	122.	1.08	1.42
ASW	SLG	SMITH FIELD	SILGAM SPRINGS	108424.	99271.	90.	0.82*	1.38*
ASW	M32	LAKE VILLAGE MUNI	LAKE VILLAGE	160274.	43105.	142.	1.01*	1.35*
ASW	BVX	BATESVILLE REGIONAL	BATESVILLE	146317.	56433.	122.	1.22	1.35
ASW	ELD	GOODWIN FIELD	EL DORADO	130400.	66698.	105.	0.78	1.31
ASW	M19	NEWPORT MUNI	NEWPORT	120619.	56051.	101.	1.07	1.17
ASW	M89	ARKADELPHIA MUNI	ARKADELPHIA	101613.	70771.	0.	1.04	1.15
ASW	7M1	MCGEHEE MUNI	MCGEHEE	70596.	102839.	50.	0.72*	1.15*
ASW	M73	ALMYRA MUNI	ALMYRA	123649.	46888.	106.	0.74*	1.13*
ASW	M99	SALINE COUNTY	BENTON	120189.	46735.	102.	0.74*	1.11*
ASW	H35	CLARKSVILLE MUNI	CLARKSVILLE	43733.	113633.	34.	0.74*	1.05*
ASW	4M3	CARLISLE MUNI	CARLISLE	74226.	76791.	0.	0.82	1.00
ASW	HRO	BOONE COUNTY	HARRISON	32125.	115848.	0.	1.79	0.98
ASW	M70	POCAHONTAS MUNI	POCAHONTAS	102979.	43156.	89.	0.67	0.97
ASW	F90	SEVIER COUNTY	DEQUEEN	105582.	37374.	91.	0.66	0.95
ASW	F43	DOWNTOWN	EL DORADO	43318.	97362.	0.	0.66	0.93
ASW	CRT	CROSSETT MUNI	CROSSETT	107699.	32161.	88.	0.68	0.93
ASW	HEE	THOMPSON-ROBBINS	HELENA/WEST HELENA	50009.	88897.	0.	1.28	0.92
ASW	ROG	ROGERS MUNI ARPT-CARTER FLD	ROGERS	48035.	87317.	2.	1.80	0.90
ASW	3M9	WARREN MUNICIPAL	WARREN	68179.	16923.	59.	0.40*	0.57*
ASW	FCY	FORREST CITY MUNI	FORREST CITY	58853.	23276.	0.	0.22	0.55
ASW	7M5	OSARK-FRANKLIN COUNTY	OSARK	35425.	39679.	0.	1.08	0.50
ASW	4M1	CARROLL COUNTY	BERRYVILLE	18869.	53138.	0.	0.30	0.48
ASW	AGD	MAGNOLIA MUNI	MAGNOLIA	15399.	50093.	0.	0.57	0.44
ASW	M78	MALVERN MUNICIPAL	MALVERN	35166.	17804.	0.	0.34	0.35
ASW	M36	FRANK FEDERER MEMORIAL	BRINKLEY	28005.	24816.	0.	0.30	0.35
ASW	4M9	CORNING MUNI	CORNING	25391.	25156.	0.	0.29	0.34
ASW	MXA	MANILA MUNI	MANILA	22154.	21294.	0.	0.25	0.29
ASW	7M4	OSCEOLA MUNI	OSCEOLA	25391.	14614.	0.	0.25	0.27
ASW	CVK	CHEROKEE VILLAGE	CHEROKEE VILLAGE	21776.	17116.	14.	0.42	0.26
ASW	7M2	HARRY E WILCOX MEMORIAL FIELD	MOUNTAIN VIEW	18370.	12323.	0.	0.19	0.20
ASW	6M8	MARKED TREE MUNI	MARKED TREE	15932.	10823.	0.	0.16	0.18
ASW	4M4	CLINTON MUNI	CLINTON	14537.	11627.	0.	0.15	0.17
ASW	M77	HOWARD COUNTY	NASHVILLE	18548.	6093.	0.	0.17	0.16
ASW	M65	WYNNE MUNI	WYNNE	12223.	10280.	0.	0.13	0.15
ASW	5M1	DE WITT MUNI	DE WITT	16430.	5363.	0.	0.15	0.14
ASW	M27	WALDRON MUNI	WALDRON	14537.	4745.	0.	0.13	0.13
ASW	MPJ	PETIT JEAN PARK	MORRILTON	13383.	4368.	0.	0.54	0.12
ASW	5M4	FORDYCE MUNI	FORDYCE	12073.	3941.	0.	0.11	0.11
ASW	6M7	LEE COUNTY-MARIANNA	MARIANNA	12073.	3941.	0.	0.11	0.11
ASW	5M5	CRYSTAL LAKE	DECATUR	7966.	2600.	0.	0.25	0.07
ASW	HUM	HOUMA-TERREBONNE	HOUMA	1574430.	391109.	1360.	17.26	13.06
ASW	RSN	RUSTON MUNI	RUSTON	685919.	187233.	635.	3.93	5.80
ASW	OR9	HAMMOND MUNI	HAMMOND	444350.	79052.	425.	2.96*	3.48*

ASW	6R0	SLIDELL	SLIDELL	65613	376435	354	2.29*	2.94*
ASW 6R1	WELSH	WELSH	LA	43796	254105	354	1.29	1.98
ASW 6R3	ABBEVILLE MUNI	ABBEVILLE	LA	53090	241798	242	1.47*	1.96*
ASW 0TN	HARRY P WILLIAMS MEMORIAL	PATTERSON	LA	142739	143464	224	4.35	1.90
ASW OPL	ST LANDRY PARISH	OPELOUSAS	LA	39765	228136	459	1.39*	1.78*
ASW ARA	ACADIANA REGIONAL	NEW IBERIA	LA	108754	130153	214	2.71	1.59
ASW LA37	THIBODAUX MUNI	THIBODAUX	LA	30815	176791	339	1.08*	1.38*
ASW 5R8	DE QUINCY INDUSTRIAL AIRPARK	DE QUINCY	LA	23858	136880	166	0.83*	1.07*
ASW DRI	BEAUREGARD PARISH	DE RIDDER	LA	23590	136350	129	0.80	1.06
ASW 4R0	MCFILLIN AIR PARK	LAKE CHARLES	LA	23068	132304	138	0.79*	1.03*
ASW 3R4	HART	MANY	LA	13198	77196	123	0.61	0.60
ASW 3R8	NATCHITOCHES MUNI	NATCHITOCHES	LA	23428	59323	74	1.64	0.55
ASW 3R2	LE GROS MEMORIAL	CROWLEY	LA	14395	69039	171	0.43*	0.55*
ASW 3F4	VIVIAN	VIVIAN	LA	51881	26477	50	0.40	0.52
ASW LA23	LEEVILLE	LEEVILLE	LA	16153	49474	0	0.49	0.44
ASW LA96	OAKLAND	FRANKLIN	LA	14652	44892	0	0.50	0.40
ASW M79	RAYVILLE MUNI	RAYVILLE	LA	11023	46677	26	0.33*	0.38*
ASW 2F8	MOREHOUSE MEMORIAL	BASTROP	LA	13101	40139	0	0.32	0.29
ASW BXA	GEORGE R CARR MEMORIAL AIR FLD	BOGALUSA	LA	10766	32983	0	0.26	0.23
ASW LA08	RICHARD PRIVETTE SR	COVINGTON	LA	8530	26134	0	0.68	0.23
ASW 3R7	JENNINGS	JENNINGS	LA	8492	26015	0	0.22	0.20
ASW 0M8	BYERLEY	LAKE PROVIDENCE	LA	7283	22308	0	0.22	0.20
ASW 0R4	CONCORDIA PARISH	VIDALIA	LA	7354	22530	0	0.22	0.19
ASW LA18	JONESVILLE	JONESVILLE	LA	7215	22101	0	0.19	0.18
ASW 9LA6	PINEVILLE MUNICIPAL	PINEVILLE	LA	6547	20059	0	0.18	0.16
ASW 4R5	EAST LAKE CHARLES	LAKE CHARLES	LA	5977	18310	54	0.35	0.14
ASW F87	FARMERVILLE	FARMERVILLE	LA	4243	16380	0	0.15	0.14
ASW 9M6	KELLY	OAK GROVE	LA	5061	15505	0	0.52	0.14
ASW 4R7	EUNICE	EUNICE	LA	5118	15679	0	0.15	0.14
ASW 2R1	JEANERETTE	JEANERETTE	LA	5006	15335	0	0.14	0.13
ASW 3F3	DESOTO PARISH	MANSFIELD	LA	4641	14218	0	0.14	0.13
ASW SPH	SPRINGHILL	SPRINGHILL	LA	4663	14287	0	0.14	0.13
ASW 0R5	DAVID G JOYCE	WINNFIELD	LA	4777	14634	0	0.13	0.12
ASW 0M9	DELHI MUNI	DELHI	LA	4523	13856	0	0.12	0.11
ASW F24	MINDEN-WEBSTER	MINDEN	LA	3943	12081	0	0.23	0.10
ASW F88	JONESBORO	JONESBORO	LA	3076	11726	37	0.10	0.09
ASW M80	SCOTT	TALLULAH	LA	3412	10455	0	0.10	0.09
ASW 2R3	WESTWEGO ARPT INC	WESTWEGO	LA	3412	10454	0	0.09	0.08
ASW F89	WINNSBORO MUNI	WINNSBORO	LA	3034	9294	0	0.08	0.07
ASW 2R7	FRANKLINTON	FRANKLINTON	LA	2757	8446	0	0.08	0.05
ASW 1R1	JENA	JENA	LA	1735	5317	0	0.05	0.05
ASW ALM	ALAMOGORDO-WHITE SANDS REGIONAL	ALAMOGORDO	NM	198397	608483	574	1.58*	5.36*
ASW LRU	LAS CRUCES-CRAWFORD	LAS CRUCES	NM	198175	582285	560	3.97*	5.19*
ASW 4AC	CORNADO	ALBUQUERQUE	NM	229390	379985	0	4.33	4.05
ASW Q64	ALAMEDA	ALBUQUERQUE	NM	92235	217470	0	2.26	2.06
ASW TCC	TUCUMCARI MUNI	TUCUMCARI	NM	47793	233029	205	2.27	1.87
ASW CNM	CAVERN CITY AIR TRML	CARLSBAD	NM	123317	134964	82	1.50	1.72
ASW GUP	SENATOR CLARKE FIELD	GALLUP	NM	133324	109465	48	3.72	1.61
ASW CVN	CLOVIS MUNI	CLOVIS	NM	130116	100103	2	4.45	1.53
ASW RUI	RUIDOSO MUNI	RUIDOSO	NM	130932	78355	0	1.29	1.39
ASW LAM	LOS ALAMOS	LOS ALAMOS	NM	37067	78355	0	0.86	1.03
ASW Q34	PORTALES MUNI	PORTALES	NM	23299	131726	124	0.80*	1.03*
ASW LVS	LAS VEGAS MUN	LAS VEGAS	NM	88141	43637	17	1.55	0.88
ASW SMC	SILVER CITY & GRANT CO	SILVER CITY	NM	109690	16241	1	1.01	0.65
ASW DMN	DEMING MUNI	DEMING	NM	32948	64938	27	1.76	0.52
ASW SKX	TAOS MUNI	TAOS	NM	33088	45241	142	0.93	0.33
ASW RTN	CREWS FLD	RATON	NM	8408	41541	33	0.51	0.28
ASW ONM	SOCORRO MUNI	SOCORRO	NM	14282	27491	0	0.87	0.28
ASW ATS	ARTESIA MUN	ARTESIA	NM	10006	30704	17	0.60	0.27

ASW	E06	LEA COUNTY-LOVINGTON	NM	30925.	10093.	0.	0.31	0.27
ASW	GNT	GRANTS-MILAN MUNI	NM	20081.	17131.	0.	0.24	0.25
ASW	E98	MID VALLEY AIRPARK	NM	7109.	18265.	0.	0.13	0.17
ASW	TCS	TRUTH OR CONSEQUENCES MUNI	NM	14762.	4818.	0.	0.48	0.13
ASW	5V5	SHIPROCK AIRSTRIP	NM	14131.	4611.	0.	0.14	0.12
ASW	1E6	TURNER RIDGEPORT	NM	993.	17509.	0.	0.07	0.12
ASW	Q14	ESPANOLA MUNI	NM	14156.	4621.	0.	0.14	0.12
ASW	Q19	AZTEC MUNI	NM	12365.	4036.	0.	0.12	0.11
ASW	E26	LEA COUNTY/JAL/	NM	11709.	3822.	0.	0.12	0.10
ASW	0E0	MORIARTY	NM	8782.	2367.	0.	0.09	0.03
ASW	E91	ANGEL FIRE	NM	0.	10501.	0.	0.04	0.07
ASW	LSB	LORDSBURG MUNI	NM	7487.	2444.	0.	0.08	0.07
ASW	Q16	RESERVE	NM	1444.	3348.	0.	0.02	0.03
ASW	Q58	SANTA ROSA MUNICIPAL	NM	3641.	1189.	0.	0.04	0.03
ASW	FSU	FORT SUMNER MUNI	NM	2952.	964.	0.	0.03	0.03
ASW	Q37	CARRIZO MUNI	NM	2166.	707.	0.	0.02	0.02
ASW	Q42	SPRINGER MUNI	NM	632.	206.	0.	0.01	0.01
ASW	E89	CONCHAS STATE PARK	NM	820.	268.	0.	0.01	0.01
ASW	NM01	DULCE	NM	820.	268.	0.	0.01	0.01
ASW	66E	FORT STANTON	NM	61.	20.	0.	0.00	0.00
ASW	SWO	STILLWATER MUNI	OK	841270.	253133.	790.	6.07	7.27
ASW	DUC	HALLIBURTON FIELD	OK	494585.	190931.	519.	3.45	4.55
ASW	GUY	GUYMON MUNI	OK	534405.	117037.	441.	5.58	4.33
ASW	OUN	MAX WESTHEIMER	OK	376704.	225811.	6.	13.71	4.00
ASW	SNL	SHAWNEE MUNI	OK	379336.	176775.	319.	4.41	3.69
ASW	ADH	ADA MUNI	OK	379163.	164155.	388.	2.91*	3.61*
ASW	F29	CLARENCE E PAGE MUNI	OK	456752.	85566.	434.	2.90*	3.60*
ASW	GOK	GUTHRIE MUNI	OK	436002.	100385.	341.	3.26	3.56
ASW	AXS	ALTUS MUNI	OK	366826.	131815.	326.	2.32*	3.16*
ASW	MKO	DAVIS FIELD	OK	345286.	130090.	311.	3.60	3.16
ASW	BVO	FRANK PHILLIPS	OK	290883.	157492.	262.	3.07	2.98
ASW	OKM	OKMULGEE MUNI.	OK	313241.	75701.	209.	2.12*	2.53*
ASW	1H6	HARVEY YOUNG	OK	263182.	85902.	0.	2.60	2.32
ASW	H45	SEMINOLE MUNI	OK	262920.	58739.	250.	1.68*	2.14*
ASW	FDR	FREDERICK MUNI	OK	226642.	85017.	0.	2.59	2.07
ASW	CUH	CUSHING MUNI	OK	259255.	48799.	229.	3.14	2.05
ASW	PNC	PONCA CITY MUNI	OK	123908.	145637.	2.	6.28	1.79
ASW	3K1	ALVA MUNI	OK	213132.	54207.	198.	1.42	1.78
ASW	ELK	ELK CITY MUNI	OK	149440.	107277.	134.	1.45	1.71
ASW	F91	THOMAS P STAFFORD	OK	154899.	60519.	143.	1.03*	1.43*
ASW	OK14	GOLDSBY	OK	81718.	131107.	0.	1.28	1.41
ASW	2EJ	EXPRESSWAY AIRPARK	OK	100391.	99048.	0.	1.21	1.33
ASW	CLK	CLINTON MUNI	OK	138547.	57662.	120.	1.17	1.30
ASW	F61	PAULS VALLEY MUNI	OK	153580.	35934.	960.	2.02	1.26
ASW	0F8	WILLIAM R. FOGUE MUNI	OK	145366.	31675.	139.	0.94*	1.18*
ASW	2DT	DOWNTOWN AIRPARK	OK	78417.	91873.	0.	0.99	1.13
ASW	F62	IDABEL	OK	125853.	40470.	107.	1.41	1.11
ASW	CHK	CHICKASHA MUNI	OK	85240.	71991.	0.	1.00	1.04
ASW	1F0	DOWNTOWN ARDMORE	OK	65869.	76692.	6.	2.82	0.95
ASW	MLC	MC ALESTER MUNI	OK	43621.	97629.	3.	2.33	0.94
ASW	1H7	GROVE MUNI	OK	38756.	93189.	0.	0.65	0.88
ASW	G3J	GAGE MUNI	OK	99048.	22562.	96.	0.76*	0.81*
ASW	5F2	DOWNTOWN AIRPARK	OK	88438.	31546.	0.	0.88	0.80
ASW	WWR	WEST WOODWARD	OK	65795.	50177.	0.	2.34	0.77
ASW	F28	MUSTANG FIELD	OK	79441.	25928.	0.	0.78	0.70
ASW	F10	HENRYETTA MUNI	OK	83031.	16167.	68.	1.15	0.66
ASW	RKR	ROBERT S KERR	OK	44034.	51157.	92.	1.44	0.63
ASW	H71	PRYOR	OK	49716.	43774.	0.	2.05	0.62
ASW	HBR	HOBERT MUNI	OK	75255.	18372.	73.	0.52	0.62

ASW	DUA	EAKER FIELD	DURANT	45846.	48114.	0.	1.21	0.62
ASW	F31	LAKE TEXOMA STATE PARK	KINGSTON	13845.	76025.	0.	0.37	0.60
ASW	M10	MIAMI MUNI	MIAMI	54301.	19008.	44.	0.63	0.49
ASW	HAX	HATBOX FIELD	MUSKOGEE	40991.	31028.	0.	0.46	0.48
ASW	H73	TAHLEQUAH MUNI	TAHLEQUAH	40896.	24964.	0.	0.44	0.44
ASW	6K4	FAIRVIEW MUNI	FAIRVIEW	42604.	22240.	0.	0.45	0.43
ASW	F36	CORDELL MUNI	CORDELL	34723.	22830.	111.	0.76	0.38
ASW	H05	WILBURTON MUNI	WILBURTON	19805.	34012.	0.	0.29	0.36
ASW	2F6	SKIATOOK MUNI	SKIATOOK	27568.	23062.	0.	0.32	0.34
ASW	F22	PERRY MUNI	PERRY	33486.	17550.	0.	0.35	0.34
ASW	OK56	BLACKWELL-TONKAWA MUNI	BLACKWELL	38655.	9888.	132.	0.97	0.32
ASW	OK08	HILL TOP PVT	LAWTON	34589.	11291.	0.	0.34	0.30
ASW	17K	BOISE CITY	BOISE CITY	28214.	14775.	0.	0.30	0.29
ASW	OK68	MEDFORD MUNI	MEDFORD	20914.	23453.	0.	0.26	0.29
ASW	6F3	EAGLES NEST	SAND SPRINGS	31627.	10323.	0.	0.31	0.28
ASW	H68	WAGONER AIRSTRIP	WAGONER	30253.	10485.	0.	0.22	0.27
ASW	SUD	STROUD MUNI	STROUD	16563.	22033.	0.	0.24	0.26
ASW	2M3	SALLISAW MUNI	SALLISAW	22664.	12962.	0.	0.23	0.23
ASW	7F4	SEQUOYAH PARK	WAGONER	21771.	12672.	0.	0.23	0.22
ASW	OK78	WATONGA	WATONGA	20942.	12514.	0.	0.23	0.21
ASW	95F	CLEVELAND MUNI	CLEVELAND	23477.	7662.	0.	0.16	0.21
ASW	F99	HOLDENVILLE MUNI	HOLDENVILLE	10796.	20638.	0.	0.23	0.21
ASW	H76	PAWUSKA MUNI	PAWUSKA	23762.	7755.	0.	0.22	0.21
ASW	3F7	JONES MEML	BRISTOW	21852.	10095.	0.	0.19	0.20
ASW	93F	MIGNON LAIRD MUNI	CHEYENNE	16829.	13827.	0.	0.17	0.20
ASW	K92	HI-WAY	BARTLESVILLE	13959.	16361.	0.	0.15	0.17
ASW	F30	SULPHUR MUNI	SULPHUR	12775.	12504.	0.	0.16	0.17
ASW	92F	CHATTANOOGA SKY HARBOR	CHATTANOOGA	14434.	10614.	0.	0.14	0.16
ASW	1F4	MADILL MUNICIPAL	MADILL	11587.	12116.	0.	0.15	0.15
ASW	OK70	MOORELAND MUNI	MOORELAND	12939.	9790.	0.	0.16	0.13
ASW	OK73	SEILING	SEILING	15028.	7688.	0.	0.13	0.14
ASW	OK60	CHEROKEE MUNI	CHEROKEE	11245.	9729.	0.	0.13	0.14
ASW	OK7	FOUNTAINHEAD LODGE AIRPARK	EUFULA	11619.	9357.	0.	0.15	0.14
ASW	OK26	TIPTON MUNI	TIPTON	15330.	5004.	0.	0.14	0.13
ASW	H04	VINITA MUNI	VINITA	13479.	5581.	0.	0.14	0.13
ASW	H66	NOWATA MUNI	NOWATA	10376.	8952.	0.	0.12	0.13
ASW	H01	CHANDLER MUNI	CHANDLER	14388.	4696.	0.	0.14	0.13
ASW	Q44	BEAVER MUNI	BEAVER	8257.	9316.	0.	0.10	0.12
ASW	F53	NASH MUNI	HUGO	11278.	4863.	0.	0.12	0.11
ASW	1F1	LAKE MURRAY STATE PARK	OVERBROOK	12158.	3968.	0.	0.10	0.09
ASW	86F	CARNEGIE MUNI	CARNEGIE	10066.	3285.	0.	0.09	0.08
ASW	91F	ARROWHEAD	CANADIAN	9643.	3147.	0.	0.07	0.08
ASW	F32	HEALDTON MUNI	HEALDTON	4821.	7139.	0.	0.08	0.08
ASW	87F	81ST STREET AIRPARK	BROKEN ARROW	8706.	2841.	0.	0.05	0.05
ASW	F38	CANEY CREEK	KINGSTON	5579.	1821.	0.	0.06	0.05
ASW	K49	MUNICIPAL	TEXOMA	6170.	2014.	0.	0.00	0.00
ASW	4F1	KEYSTONE AIR PARK	CLEVELAND	242.	79.	0.	0.00	0.00
ASW	SGR	HULL FIELD	HOUSTON	2466429.	522147.	2310.	14.74	19.86
ASW	ILE	KILLEEN MUNI	KILLEEN	1964283.	445407.	1859.	11.59*	16.01*
ASW	MDD	MIDLAND AIRPARK	MIDLAND	1943066.	374619.	1821.	12.04*	15.40*
ASW	TDW	TRADEWIND	ANARILLO	1503804.	327026.	1399.	9.27*	12.16*
ASW	HPY	HUMPHREY	HOUSTON	1497868.	261223.	1394.	9.03*	11.69*
ASW	DT0	DENTON MUNI	DENTON	1228634.	227671.	1122.	7.24*	9.68*
ASW	TPL	DRAUGHON-MILLER MUNI	TEMPLE	1117432.	291292.	1137.	6.48	9.36
ASW	AAP	ANDRAU AIRPARK	HOUSTON	1167602.	199804.	1110.	8.60*	9.09*
ASW	F42	PHIL L HUDSON FIELD	MESQUITE	1012519.	203616.	942.	6.17*	8.08*
ASW	SPX	HOUSTON GULF	LEAGUE CITY	727633.	125654.	685.	4.17*	5.67
ASW	F54	ARLINGTON MUNI	ARLINGTON	645358.	152069.	585.	4.82	5.30
ASW	T02	CLOVER FIELD	HOUSTON	529242.	215960.	0.	5.31	4.95

ASW	LFK	ANGELINA COUNTY	LUFKIN	515024.	187054.	486.	3.24	4.66
ASW	F60	MCGREGOR MUNI	MCGREGOR	478981.	162514.	432.	3.52	4.26
ASW	MWL	MINERAL WELLS	MINERAL WELLS	502177.	87601.	482.	3.11	3.92
ASW	T27	BURNET MUNI KATE CRADDOCK FIELD	BURNET	447658.	116112.	424.	3.11*	3.75*
ASW	T39	HUNTSVILLE MUNI	HUNTSVILLE	484499.	79339.	483.	2.18	3.75
ASW	3R3	TIMS AIRPARK	AUSTIN	433810.	119263.	1085.	7.34	3.67
ASW	GVT	MAJORS	GREENVILLE	544622.	975866.	486.	2.45*	3.43*
ASW	E02	SCHLEMEYER FIELD	ODESSA	367429.	156826.	834.	9.21	3.48*
ASW	F18	CLEBURNE MUNI	CLEBURNE	429151.	74757.	400.	2.60*	3.35*
ASW	F67	GRAND PRAIRIE MUNI	GRAND PRAIRIE	304398.	196112.	0.	3.55	3.33
ASW	ALI	ALICE INTERNATIONAL	ALICE	426824.	71041.	3316.	2.05	3.31
ASW	T47	KICKAPOO DOWNTOWN AIRPARK	WICHITA FALLS	393232.	86893.	353.	2.33*	3.19*
ASW	T41	LA PORTE MUNI	LA PORTE	375417.	101058.	1043.	6.76	3.17
ASW	BWD	BROWNWOOD MUNI	BROWNWOOD	303703.	161395.	279.	3.87	3.09
ASW	21XS	BIG SPRING	BIG SPRING	390310.	69776.	360.	2.32*	3.06*
ASW	PRX	COX FLD	PARIS	299977.	155820.	289.	2.41	3.03
ASW	DHT	DALHART MUNI	DALHART	315878.	116966.	262.	2.74	2.88
ASW	F26	DALLAS NORTH	PLANO	243494.	184839.	0.	2.88	2.85
ASW	3R0	BEEVILLE MUNI	BEEVILLE	342328.	60529.	328.	2.00*	2.68*
ASW	F70	MANGHAM FLD	FORT WORTH	282869.	97698.	0.	2.78	2.53
ASW	T69	SINTON	SINTON	322499.	54670.	179.	1.67	2.51
ASW	T29	PEARLAND	PEARLAND	194307.	168784.	0.	2.40	2.41
ASW	DRT	DEL RIO INTL	DEL RIO	226473.	135097.	866.	3.93	2.40
ASW	TRL	TERRELL MUNICIPAL	TERRELL	296631.	54806.	257.	2.33	2.34
ASW	BMT	BEAUMONT MUNI	BEAUMONT	221281.	84509.	716.	4.77	2.03
ASW	T17	WEISER AIR PARK	HOUSTON	226577.	73955.	0.	2.17	2.00
ASW	CNW	JAMES CONNALLY	WACO	233522.	46084.	192.	1.43*	1.86*
ASW	CRS	CORSICANA MUNI	CORSICANA	234539.	43326.	220.	1.36	1.85
ASW	3R1	BAY CITY MUNI	BAY CITY	236195.	41192.	220.	1.42*	1.84*
ASW	GLE	GAINESVILLE MUNI	GAINESVILLE	228635.	43336.	209.	1.80	1.81
ASW	T86	LAKESIDE	HOUSTON	219921.	52108.	955.	4.17	1.81
ASW	LJN	BRAZORIA COUNTY	LAKE JACKSON	122533.	141221.	201.	1.73	1.75
ASW	PSX	PALACIOS MUNI	PALACIOS	224414.	34282.	92.	0.60	1.72
ASW	4R2	HORSESHOE BAY	MARBLE FALLS	210184.	36974.	190.	1.75	1.64
ASW	F03	MT PLEASANT MUNI	MT PLEASANT	204265.	35633.	190.	1.24	1.59
ASW	PEQ	PECOS MUNI	PECOS CITY	181886.	36999.	141.	1.84	1.45
ASW	LNC	LANCASTER	LANCASTER	184255.	33440.	164.	1.93	1.45
ASW	F82	TOWN & COUNTRY AIRPARK	LUBBOCK	154565.	50450.	0.	1.51	1.36
ASW	WEA	PARKER COUNTY	WEATHERFORD	154758.	45493.	517.	3.41	1.33
ASW	JAS	JASPER COUNTY AIRPORT-BELL FIELD	JASPER	171108.	28340.	169.	0.90	1.33
ASW	F69	AIR PARK-DALLAS	DALLAS	150818.	49228.	0.	1.47	1.33
ASW	ASL	HARRISON COUNTY	MARSHALL	167077.	29138.	155.	1.01*	1.30*
ASW	F05	WILBARGER COUNTY	VERNON	163036.	28507.	151.	1.00*	1.27*
ASW	OCH	EAST TEXAS REGIONAL	NACOGDOCHES	62343.	125712.	0.	2.70	1.25
ASW	SNK	WINSTON FIELD	SNYDER	154040.	30152.	120.	1.47	1.22
ASW	BGD	HUTCHINSON COUNTY	BORGER	78646.	101544.	152.	2.11	1.20
ASW	ELA	EAGLE LAKE	EAGLE LAKE	137064.	23465.	130.	0.71	1.07
ASW	PPA	PERRY LEFORS FIELD	PAMPA	129820.	28535.	85.	1.15	1.05
ASW	PSN	PALESTINE MUNI	PALESTINE	122193.	26892.	114.	0.75	0.99
ASW	FST	PECOS COUNTY	FORT STOCKTON	122850.	26290.	87.	1.60	0.99
ASW	T98	SAN MARCOS MUNI	SAN MARCOS	119796.	29535.	465.	2.28	0.99
ASW	CDS	CHILDRESS MUNI	CHILDRESS	126985.	21244.	124.	0.61	0.98
ASW	T04	GEORGETOWN MUNI	GEORGETOWN	107036.	29546.	262.	1.84	0.91
ASW	F46	ROCKWALL MUNI	ROCKWALL	102339.	33405.	0.	1.00	0.90
ASW	F14	WICHITA VALLEY	WICHITA FALLS	94221.	41595.	0.	3.13	0.90
ASW	F39	GRAYSON CO	SHERMAN-DENISON	68992.	65720.	0.	2.41	0.90
ASW	F72	OAK GROVE	FORT WORTH	113181.	20777.	99.	0.65*	0.89*
ASW	SWI	SHERMAN MUNICIPAL	SHERMAN	102327.	29720.	89.	0.83	0.88
ASW	7F3	CADDO MILLS MUN	CADDO MILLS	100014.	32648.	0.	0.98	0.88
ASW	Q70	STRATFORD FIELD	STRATFORD	109636.	21875.	102.	0.67*	0.87*

ASM	F04	SAGINAW	TX	37037.	12089.	0.	0.35	0.33
ASM	T92	MASON COUNTY	TX	39330.	9521.	37.	0.26*	0.32*
ASM	F13	CHEROKEE COUNTY	TX	36553.	11931.	0.	1.21	0.32
ASM	69R	EDWARDS COUNTY	TX	42065.	6604.	138.	0.16	0.32
ASM	RFG	ROOKE FIELD	TX	37004.	9748.	113.	0.73	0.31
ASM	Q54	BENGER AIR PARK	TX	34421.	11236.	0.	0.34	0.30
ASM	1E5	HEMPHILL COUNTY	TX	35405.	9524.	12.	0.73	0.30
ASM	5R5	WHARTON MUNI	TX	33878.	11058.	0.	1.11	0.30
ASM	T00	CHAMBERS COUNTY	TX	33929.	11075.	0.	0.33	0.30
ASM	T90	GUADALUPE COUNTY	TX	33878.	11058.	0.	0.33	0.30
ASM	6R4	BIRD'S NEST	TX	35479.	9233.	114.	0.74	0.30
ASM	52F	AERO VALLEY	TX	33270.	10862.	0.	0.32	0.29
ASM	61F	KEZER AIR RANCH	TX	31487.	10278.	0.	0.30	0.28
ASM	2F7	COMMERCE MUNI	TX	34559.	6027.	32.	0.21*	0.27*
ASM	EGP	EAGLE PASS MUNI	TX	28645.	9768.	0.	0.29	0.26
ASM	Q41	FLOYDADA MUNI	TX	29644.	9676.	0.	0.29	0.26
ASM	F00	JONES FIELD	TX	28644.	9676.	0.	0.29	0.26
ASM	BKD	STEPHENS COUNTY	TX	29755.	9691.	1.	0.97	0.26
ASM	E52	VEGA-OLDHAM COUNTY	TX	28833.	9413.	0.	0.28	0.25
ASM	T53	NUECES COUNTY	TX	27527.	8985.	0.	0.27	0.24
ASM	T72	HEARNE MUNI	TX	27526.	8984.	0.	0.27	0.24
ASM	ONY	OLNEY MUNI	TX	24812.	11632.	81.	0.54	0.24
ASM	Q43	SUNRAY	TX	26687.	8711.	0.	0.26	0.24
ASM	ECE	EL CAMPO METRO AIRPORT INC	TX	27632.	9019.	0.	0.27	0.24
ASM	40F	FLYING TIGERS	TX	22297.	13163.	0.	0.23	0.24
ASM	E11	ANDREWS COUNTY	TX	27527.	3985.	0.	0.90	0.24
ASM	T78	LIBERTY MUNI	TX	26463.	8637.	0.	0.26	0.23
ASM	T31	PORT ISABEL-CAMERON COUNTY	TX	26882.	7237.	75.	0.49	0.23
ASM	TX05	AERO COUNTRY	TX	26214.	8555.	0.	0.25	0.23
ASM	VHN	CULBERSON COUNTY	TX	18462.	8637.	0.	0.87	0.23
ASM	SLR	SULPHUR SPRINGS MUNI	TX	18428.	15725.	0.	0.76	0.23
ASM	31R	GIDDINGS-LEE COUNTY	TX	29676.	5174.	27.	0.18*	0.23*
ASM	E35	FABENS	TX	25054.	8178.	0.	0.24	0.22
ASM	ATA	ATLANTA MUNI	TX	25408.	8293.	0.	0.83	0.22
ASM	E13	CRANE COUNTY	TX	25408.	8293.	0.	0.25	0.22
ASM	E29	SONORA MUNI	TX	23689.	7461.	13.	0.73	0.21
ASM	Q46	EDWARD WARREN FLD	TX	23393.	7636.	0.	0.23	0.21
ASM	59F	SEAGOVILLE	TX	23965.	7822.	0.	0.23	0.21
ASM	E01	ROY HURD MEMORIAL	TX	24350.	7948.	0.	0.24	0.21
ASM	3F6	DAN E RICHARDS MUNICIPAL	TX	23323.	7613.	0.	0.23	0.21
ASM	26R	JACKSON COUNTY	TX	22234.	7257.	0.	0.22	0.20
ASM	2R9	KARNES COUNTY	TX	23135.	6296.	61.	0.40	0.20
ASM	3R9	LAKELAND AIRPARK	TX	23065.	7527.	0.	0.22	0.20
ASM	F06	MARIAN AIRPARK	TX	22198.	7246.	0.	0.22	0.20
ASM	07R	BISHOP MUNI	TX	21786.	7111.	0.	0.21	0.19
ASM	00R	LIVINGSTON MUNI	TX	21344.	6967.	0.	0.20	0.19
ASM	11R	BRENNHAM MUNI	TX	22478.	5896.	70.	0.58	0.19
ASM	88D	CURTIS FIELD	TX	21170.	6910.	0.	0.21	0.19
ASM	F56	ARLEDGE FIELD	TX	21170.	6910.	0.	0.21	0.19
ASM	3F0	BLUE MOUND	TX	19608.	7290.	0.	0.19	0.18
ASM	COM	COLEMAN MUNI	TX	21541.	5513.	74.	0.50	0.18
ASM	1F3	HARTLEE FIELD	TX	20525.	6700.	0.	0.20	0.18
ASM	TX80	FOLLETT/LIPSCOMB COUNTY	TX	21501.	5708.	64.	0.41	0.18*
ASM	JCT	KIMBLE COUNTY	TX	23048.	4020.	21.	0.14*	0.18*
ASM	ETN	EASTLAND MUNI	TX	20274.	5276.	65.	0.42	0.17
ASM	E57	DENVER CITY	TX	19057.	6220.	0.	0.19	0.17
ASM	F25	OBRIEN AIRPARK	TX	18518.	6044.	0.	0.18	0.16
ASM	2F9	TOM DANAEHER	TX	18518.	6044.	0.	0.18	0.16
ASM	07F	GLADEWATER MUNI	TX	17624.	5752.	0.	0.17	0.16
ASM	1E9	GARTRELL FIELD	TX	18518.	6044.	0.	0.18	0.16

TX06	MEXIA-LIMESTONE CO.	TX	18502.	4874.	57.	0.36	0.16
ASW 74R	HORIZON	TX	17873.	5833.	0.	0.17	0.16
ASW 728	LAMPASAS	TX	19066.	4841.	67.	0.38	0.16
ASW 775	KNOX CITY MUNI	TX	17191.	5611.	0.	0.16	0.15
ASW 23R	DEVINE MUNI	TX	16708.	5453.	0.	0.16	0.15
ASW 776	CLARKSVILLE-RED RIVER CO	TX	16938.	5528.	0.	0.16	0.15
ASW 7R9	BAILES	TX	17445.	5694.	0.	0.17	0.15
ASW 703	GENOA	TX	16253.	5306.	0.	0.16	0.14
ASW 3F2	CISCO MUNI	TX	11646.	9168.	0.	0.13	0.14
ASW 142	BALL	TX	15998.	5222.	0.	0.15	0.14
ASW 45R	HARDIN COUNTY	TX	15830.	5183.	0.	0.15	0.14
ASW 6R3	CLEVELAND MUNI	TX	14819.	4837.	0.	0.14	0.13
ASW 774	TAYLOR MUNI	TX	14218.	4641.	0.	0.14	0.13
ASW 64R	PEARLAND	TX	16463.	3798.	77.	0.20	0.13
ASW F98	YOAKUM COUNTY	TX	14161.	4622.	0.	0.14	0.12
ASW 900	MUNICIPAL	TX	13761.	4492.	0.	0.13	0.12
ASW 5F1	POST-GARZA COUNTY MUNI	TX	13903.	4538.	0.	0.14	0.12
ASW F85	COCHRAN COUNTY	TX	13367.	4363.	0.	0.13	0.12
ASW T96	EL CAMPO AIRPARK	TX	12504.	4082.	0.	0.12	0.11
ASW F45	IRAAAN MUNI	TX	10893.	3556.	0.	0.10	0.10
ASW T12	KIRBYVILLE	TX	10893.	3556.	0.	0.10	0.10
ASW 9F9	SYCAMORE STRIP	TX	10952.	3575.	0.	0.11	0.10
ASW 81R	SAN SABA COUNTY MUNICIPAL	TX	10893.	3556.	0.	0.11	0.10
ASW 31F	GAINES COUNTY	TX	11645.	3801.	0.	0.11	0.10
ASW PEZ	PLEASANTON MUNI	TX	11646.	3801.	0.	0.11	0.10
ASW F21	MEMPHIS MUNI	TX	10585.	3455.	0.	0.10	0.09
ASW 77F	WINTERS MUNI	TX	11355.	2941.	37.	0.24	0.09
ASW 7F7	CLIFTON MUNI	TX	10585.	3455.	0.	0.10	0.09
ASW 60F	SEYMOUR MUNI	TX	10585.	3455.	0.	0.10	0.09
ASW 60R	NAVASOTA MUNI	TX	11870.	2070.	11.	0.07*	0.09*
ASW T26	BAY CITY	TX	10076.	3289.	0.	0.10	0.09
ASW F83	ABERNATHY MUNI	TX	9055.	2956.	0.	0.09	0.08
ASW T56	HOUSTON COUNTY	TX	8927.	2914.	0.	0.09	0.08
ASW F97	SEAGRAVES	TX	9446.	3083.	0.	0.09	0.08
ASW E34	CLARENDON MUNI	TX	8715.	2844.	0.	0.08	0.08
ASW 7F9	COMANCHE COUNTY-CITY	TX	9589.	3130.	0.	0.09	0.08
ASW T21	HAMILTON MUNI	TX	9527.	3110.	0.	0.09	0.08
ASW 4F4	GILMER-UPSHUR COUNTY	TX	7414.	2420.	0.	0.07	0.07
ASW 54R	ZUEHL	TX	8254.	2695.	0.	0.08	0.07
ASW 8F4	FOARD COUNTY	TX	8465.	2763.	0.	0.08	0.07
ASW T94	TWIN-OAKS	TX	8476.	2767.	0.	0.08	0.07
ASW F64	FLYING OAKS	TX	7999.	2611.	0.	0.08	0.07
ASW 21F	JACKSBORO MUNI	TX	8484.	2769.	0.	0.08	0.07
ASW TX07	PRESIDIO LELY INTL	TX	8272.	2700.	0.	0.08	0.07
ASW F01	QUANAH MUNI	TX	7415.	2420.	0.	0.07	0.07
ASW E30	BRUCE FIELD	TX	8466.	2763.	0.	0.08	0.07
ASW 8F3	CROSBYTON MUNI	TX	6352.	2073.	0.	0.06	0.06
ASW 05F	CITY-COUNTY	TX	6352.	2073.	0.	0.06	0.06
ASW 28F	ALTA VISTA	TX	6552.	2139.	0.	0.06	0.06
ASW 9R4	TANNER'S	TX	5701.	1861.	0.	0.05	0.05
ASW F66	CARROLL AIR PARK	TX	5531.	1806.	0.	0.05	0.05
ASW T33	FLYING L RANCH	TX	5447.	1778.	0.	0.05	0.05
ASW 34R	HALLETTSVILLE MUNI	TX	6203.	2024.	0.	0.06	0.05
ASW 37F	MUNDAY MUNICIPAL	TX	6122.	1998.	0.	0.06	0.05
ASW 1E4	PALO DURO	TX	6194.	2022.	0.	0.06	0.05
ASW 70F	FLYING HEART RANCH	TX	4000.	1306.	0.	0.04	0.04
ASW 9F0	DUBLIN MUNICIPAL	TX	4237.	1383.	0.	0.04	0.04
ASW 68F	TEAGUE MUNICIPAL	TX	3064.	1000.	0.	0.03	0.03
ASW 46F	LAVON NORTH	TX	2129.	695.	0.	0.02	0.02
ASW 63F	MUNI	TX	1606.	524.	0.	0.02	0.01

ASW TA41 SUNLAND AIRPARK

WESTERN PACIFIC REGION

AWP P16 FALCON FIELD
 AWP PRC PRESCOTT MUNI
 AWP P08 COOLIDGE FLORENCE MUNI
 AWP P37 GLENDALDE MUNI
 AWP FHU SIERRA VISTA MUNI
 AWP INW WINSLOW MUNI
 AWP P10 CHANDLER MUNI
 AWP PGA PAGE MUNICIPAL
 AWP LHU LAKE HAVASU CITY
 AWP P06 BULLHEAD CITY
 AWP E63 GILA BEND MUNI
 AWP P14 HOLBROOK MUNI
 AWP P34 WINDOW ROCK
 AWP RYN RYAN FIELD
 AWP SOW SHOW LOW MUNI
 AWP DUG BISBEE DOUGLAS INTL
 AWP SEZ SEDONA
 AWP P33 COCHISE COUNTY
 AWP SJN ST JOHNS MUNI
 AWP E14 AVRA VALLEY
 AWP E18 CAREFREE
 AWP Q35 SPRINGVILLE-EAGAR MUNI
 AWP P32 WILLIAMS MUNI
 AWP SAD SAFFORD MUNI
 AWP CGZ CASA GRANDE MUNI
 AWP IGM MOHAVE COUNTY
 AWP E51 BAGDAD
 AWP P52 COTTONWOOD
 AWP P20 PARKER MUNI
 AWP L07 MEMORIAL AIRFIELD
 AWP 4PH POLACCA
 AWP 4E0 TAYLOR
 AWP P13 GLOBE-SAN CARLOS REGIONAL AIR FACILITY
 AWP E55 PIERCE
 AWP P19 STELLAR AIRPARK
 AWP OLS NOGALES INTL
 AWP E69 PAYSON
 AWP MZJ MARANA AIRPARK
 AWP E60 ELOY MUNI
 AWP DGL DOUGLAS MUNI
 AWP E19 TURF
 AWP TBC TUBA CITY
 AWP P04 BISBEE MUNI
 AWP BXK BUCKEYE MUNI
 AWP E25 WICKENBURG MUNI
 AWP 01E HEREFORD
 AWP E78 SELLS
 AWP E24 WHITERIVER
 AWP E64 FRAM
 AWP CFT GREENLEE COUNTY
 AWP 0V7 KAYENTIA
 AWP U30 TEMPLE BAR
 AWP E58 THREE POINT
 AWP E76 RIMROCK

EL PASO

TX

1702.

556.

0. 0.02

0.01

MESA 509984. 271816. 0. 6.45 5.19
 PRESCOTT AZ 475662. 259239. 3. 15.69 4.39
 COOLIDGE AZ 336338. 109791. 0. 3.88 2.96
 GLENDALDE AZ 310413. 115502. 0. 2.57 2.83
 SIERRA V 264. 149470. 264. 1.57* 2.43*
 WINSLOW AZ 173958. 147198. 97. 4.51 2.17
 CHANDLER AZ 184867. 112980. 0. 1.92 1.98
 PAGE AZ 116369. 143344. 0. 4.66 1.73
 LAKE HAVASU CITY AZ 101116. 138343. 1. 4.57 1.59
 BULLHEAD CITY AZ 100047. 138013. 0. 1.44 1.58
 GILA BEND AZ 127504. 94376. 0. 1.36 1.47
 HOLBROOK AZ 140048. 63293. 0. 1.37 1.35
 WINDOW ROCK AZ 73574. 120591. 51. 0.94* 1.29*
 TUCSON AZ 138564. 48129. 0. 1.31 1.24
 SHOW LOW AZ 59512. 116346. 0. 0.92 1.17
 DOUGLAS BISBEE AZ 86827. 85256. 11. 2.92 1.14
 SEDONA AZ 74106. 74318. 66. 0.60* 0.99*
 WILLCOX AZ 94333. 42037. 0. 0.92 0.91
 ST JOHNS AZ 41718. 93371. 152. 1.40 0.90
 TUCSON AZ 98464. 32148. 0. 0.93 0.87
 CAREFREE AZ 16956. 110897. 0. 0.66 0.85
 SPRINGVILLE AZ 15091. 110289. 0. 0.65 0.83
 WILLIAMS AZ 9712. 108533. 0. 0.60 0.79
 SAFFORD AZ 58650. 45509. 0. 0.64 0.69
 CASA GRANDE AZ 72976. 23823. 0. 0.69 0.64
 KINGMAN AZ 37659. 57816. 1. 1.00 0.63
 BAGDAD AZ 25910. 64677. 0. 0.42 0.60
 COTTONWOOD AZ 23854. 66364. 0. 0.41 0.60
 PARKER AZ 43694. 46465. 0. 0.51 0.60
 CHANDLER AZ 63325. 20675. 0. 0.58 0.56
 POLACCA AZ 7315. 71961. 0. 0.29 0.53
 TAYLOR AZ 7339. 66628. 0. 0.27 0.49
 GLOBE AZ 38120. 24136. 0. 0.39 0.41
 BUCKEYE AZ 45850. 14969. 0. 0.42 0.40
 CHANDLER AZ 41402. 13515. 0. 0.38 0.36
 NOGALES AZ 38715. 12635. 0. 0.36 0.34
 PAYSON AZ 24814. 14381. 0. 0.25 0.26
 MARANA AZ 27759. 9131. 0. 0.26 0.25
 ELOY AZ 14188. 22201. 0. 0.19 0.24
 DOUGLAS AZ 22373. 7304. 0. 0.22 0.20
 PHOENIX AZ 22115. 7219. 0. 0.22 0.19
 TUBA CITY AZ 14159. 4621. 0. 0.13 0.12
 BISBEE AZ 7907. 8205. 0. 0.09 0.11
 BUCKEYE AZ 11469. 3744. 0. 0.11 0.10
 WICKENBURG AZ 9062. 5101. 0. 0.09 0.09
 SIERRA VISTA AZ 7862. 2566. 0. 0.07 0.07
 SELLS AZ 7002. 2285. 0. 0.06 0.06
 WHITERIVER AZ 6376. 2081. 0. 0.06 0.06
 GLENDALDE AZ 5175. 1689. 0. 0.05 0.05
 CLIFTON-MORENCI AZ 6239. 2036. 0. 0.06 0.05
 KAYENTIA AZ 3901. 1273. 0. 0.04 0.03
 TEMPLE BAR AZ 1484. 3302. 0. 0.02 0.03
 CASA GRANDE AZ 2433. 794. 0. 0.02 0.02
 RIMROCK AZ 1572. 513. 0. 0.01 0.01

AWP	Q32	CHINLE	CHINLE	AZ	1609.	525.	0.	0.02	0.01
AWP	PRB	PASO ROBLES MUNI	PASO ROBLES	CA	1610708.	372034.	1759.	9.73*	13.17*
AWP	RBL	RED BLUFF MUNI	RED BLUFF	CA	1488074.	322699.	1688.	4.65	12.03
AWP	ACV	ARCATA	ARCATA/EUREKA/	CA	1171275.	300033.	1235.	3.69	9.78
AWP	CCB	CABLE	UPLAND	CA	1124527.	226931.	988.	4.59	8.98
AWP	VIS	VISALIA MUNI	VISALIA	CA	796231.	255095.	722.	8.20	6.99
AWP	L47	SANTA YNEZ	SANTA YNEZ	CA	691418.	157397.	707.	5.38*	5.64*
AWP	103	LODI	LODI	CA	662685.	118174.	677.	4.86*	5.19*
AWP	L66	CORONA MUNI	CORONA	CA	550587.	179718.	0.	17.66*	4.85
AWP	PTV	PORTERVILLE MUNI	PORTERVILLE	CA	559086.	153088.	447.	8.34	4.73
AWP	MVI	WATSONVILLE MUNI	WATSONVILLE	CA	548224.	143677.	579.	3.69*	4.60*
AWP	WLW	WILLOWS-GLENN COUNTY	WILLOWS	CA	556337.	88185.	615.	1.93	4.28
AWP	008	COLUSA COUNTY	COLUSA	CA	475847.	82761.	484.	3.31*	3.71*
AWP	CMA	CAMARILLO	CAMARILLO	CA	398449.	154109.	0.	4.25	3.67
AWP	SBP	SAN LUIS OBISPO COUNTY	SAN LUIS OBISPO	CA	301185.	203580.	4.	12.94	3.35
AWP	056	GNOS FLD	NOVATO	CA	294359.	201457.	0.	3.53	3.29
AWP	CPM	COMPTON	COMPTON	CA	342422.	123896.	0.	3.27	3.10
AWP	000	ALTURAS MUNI	ALTURAS	CA	303514.	144371.	311.	2.71*	2.98*
AWP	LSN	LOS BANOS MUNI	LOS BANOS	CA	357623.	76392.	329.	4.05	2.88
AWP	UDD	BERMUDA DUNES	BERMUDA DUNES	CA	366382.	63077.	372.	2.51*	2.85*
AWP	SBT	TRI CITY	SAN BERNARDINO	CA	316282.	108686.	331.	2.27	2.82
AWP	WHP	WHITEMAN	LOS ANGELES	CA	293680.	105501.	0.	2.74	2.65
AWP	022	COLUMBIA	COLUMBIA	CA	220440.	177307.	0.	2.81	2.64
AWP	Q60	SIERRA SKY PARK	FRESNO	CA	208582.	159745.	0.	2.43	2.45
AWP	CEC	JACK MC NAMARA FIELD	CRESCENT CITY	CA	276808.	84203.	325.	0.87	2.40
AWP	L67	RIALTO MUNI /MIRO FLD/	RIALTO	CA	265160.	92181.	0.	2.59	2.33*
AWP	SIY	SISKIYOU COUNTY	MONTAGUE	CA	208638.	141705.	208.	1.80*	2.33*
AWP	OVE	OROVILLE MUNI	OROVILLE	CA	182915.	165067.	0.	2.42	2.31
AWP	LPC	LOMPOC	LOMPOC	CA	212049.	132019.	0.	2.46	2.29
AWP	045	NUT TREE	VACAVILLE	CA	256466.	83695.	0.	12.93	2.26
AWP	011	PHOENIX FIELD	FAIR OAKS	CA	167845.	160145.	0.	2.26	2.18
AWP	TRK	TRUCKEE-TAHOE	TRUCKEE	CA	165454.	159363.	0.	7.41	2.16
AWP	085	BENTON FIELD	REDDING	CA	157396.	156738.	0.	2.13	2.09
AWP	PVF	PLACERVILLE	PLACERVILLE	CA	159959.	145247.	0.	2.03	2.03
AWP	017	NEVADA COUNTY AIR PARK	GRASS VALLEY	CA	186331.	109139.	0.	2.13	1.96
AWP	BLH	BLTYHE	BLYTHE	CA	130579.	145340.	16.	5.48	1.83
AWP	L16	MEADOWLARK	HUNTINGTON BEACH	CA	206151.	67302.	0.	1.92	1.82
AWP	Q99	SOUTH COUNTY ARPT OF SANTA CLARA COUNTY	SAN MARTIN	CA	204216.	66661.	0.	2.14	1.80
AWP	041	WOODLAND-WATTS FLD	WOODLAND	CA	150645.	116627.	0.	5.22	1.78
AWP	FOT	ROHNERVILLE	FORTUNA	CA	223286.	40572.	216.	1.75	1.75
AWP	307	HOLLISTER MUNI	HOLLISTER	CA	160014.	100508.	0.	1.85	1.73
AWP	AVX	CATALINA	AVOLON	CA	125765.	118596.	0.	1.60	1.62
AWP	EED	NEEDLES	NEEDLES	CA	206533.	35196.	300.	1.57*	1.61*
AWP	2Q3	YOLO COUNTY	WINTERS/DAVIS/WOODLAND	CA	183236.	59814.	0.	1.92	1.61
AWP	DLO	DELANO MUNI	DELANO	CA	156387.	78129.	118.	2.14	1.56
AWP	SZP	SANTA PAULA	SANTA PAULA	CA	164459.	68148.	0.	1.59	1.55
AWP	RIR	RIVERSIDE FLA-BOB	RIVERSIDE/RUBIDOUX/	CA	175708.	57360.	0.	1.64	1.55
AWP	BWC	BRAWLEY MUNI	BRAWLEY	CA	149334.	77739.	0.	1.67	1.51
AWP	Q33	MAINE PRAIRIE	DIXON	CA	165120.	53910.	0.	1.66	1.46
AWP	027	OAKDALE	OAKDALE	CA	171746.	44689.	138.	1.58	1.44
AWP	Q59	FREMONT	FREMONT	CA	144072.	71083.	0.	1.60	1.43
AWP	Q53	FRANKLIN FIELD	FRANKLIN	CA	158964.	51874.	0.	1.66	1.40
AWP	UKI	UKIAH MUNI	UKIAH	CA	79867.	131429.	0.	4.02	1.40
AWP	001	SANTA ROSA AIR CENTER	SANTA ROSA	CA	157217.	51316.	0.	1.64	1.39
AWP	HAF	HALF MOON BAY	HALF MOON BAY	CA	152180.	56904.	0.	1.62	1.39
AWP	HMT	HEMET-RYAN	HEMET	CA	149230.	48792.	0.	1.56	1.32
AWP	SRU	SKYPARK	SANTA CRUZ	CA	104906.	92164.	0.	1.31	1.31
AWP	MTH	MAMMOTH LAKES	MAMMOTH LAKES	CA	67158.	127282.	0.	1.21	1.29
AWP	105	MONTAGUE-YREKA	MONTAGUE	CA	65125.	126617.	0.	1.18	1.27

CLG	CLG	COALINGA MUNI	CA	60785.	123023.	0.	1.09	1.22
AWP	005	CHESTER	CA	133514.	46782.	136.	1.18*	1.20*
AWP	033	CALISTOGA AIRPARK	CA	135955.	44384.	0.	1.42	1.20
AWP	L12	REDLANDS MUNI	CA	90665.	87412.	0.	1.17	1.18
AWP	005	UNIVERSITY	CA	134753.	43518.	491.	3.47	1.18
AWP	CXL	CALEXICO INTL	CA	89183.	87015.	0.	1.15	1.17
AWP	089	FALL RIVER MILLS	CA	52559.	122550.	0.	1.06	1.16
AWP	036	TRACY MUNI	CA	117954.	50630.	0.	3.13	1.12
AWP	102	LAMPSON	CA	102386.	57625.	0.	1.16	1.06
AWP	BIH	BISHOP	CA	41230.	11819.	0.	2.44	1.06
AWP	069	PETALUMA SKY RANCH	CA	99591.	56112.	0.	1.13	1.03
AWP	AUN	AUBURN MUNI	CA	87327.	62241.	0.	1.03	0.99
AWP	OCN	OCEANSIDE MUNI	CA	103093.	45776.	0.	1.12	0.99
AWP	018	HANFORD MUNI	CA	109548.	35757.	0.	3.86	0.97
AWP	TSP	TEHACHAPI-KERN COUNTY	CA	54551.	90167.	0.	0.84	0.96
AWP	012	ANTIOCH	CA	107424.	35064.	0.	1.12	0.95
AWP	MHV	MOJAVE	CA	32304.	108357.	0.	0.74	0.93
AWP	093	SONOMA VALLEY	CA	104906.	34239.	0.	1.10	0.92
AWP	048	MENDOCINO COUNTY	CA	22017.	112550.	0.	0.74	0.89
AWP	L45	BAKERSFIELD AIRPARK	CA	99591.	32506.	0.	1.04	0.88
AWP	IYK	INYO-KERN COUNTY	CA	19647.	111775.	0.	0.71	0.87
AWP	TLR	TULARE MUNICIPAL	CA	92764.	33680.	0.	0.98	0.84
AWP	MAE	MADERA MUNI	CA	85154.	35025.	0.	4.61	0.80
AWP	L39	RAMONA	CA	90205.	29447.	0.	0.94	0.80
AWP	L08	BORREGO VALLEY	CA	65206.	51497.	0.	0.79	0.78
AWP	Q68	PINE MOUNTAIN LAKE	CA	88195.	28784.	0.	0.63	0.78
AWP	TRM	THERMAL	CA	34129.	83631.	0.	0.92	0.76
AWP	088	RIO VISTA MUNI	CA	88195.	28784.	0.	0.89	0.76
AWP	L49	SKYLARK FIELD	CA	86162.	28131.	0.	0.90	0.76
AWP	034	CALAVERAS COUNTY	CA	58611.	54512.	0.	0.71	0.75
AWP	206	CHOWCHILLA	CA	69263.	37069.	0.	0.78	0.71
AWP	070	WESTOVER FLD AMADOR COUNTY	CA	62965.	39858.	0.	0.73	0.68
AWP	BNG	BANNING MUNI	CA	68258.	31939.	0.	0.75	0.67
AWP	L71	CALIFORNIA CITY MUNI	CA	68276.	31929.	0.	0.75	0.67
AWP	L35	BIG BEAR CITY	CA	72598.	23692.	0.	0.76	0.64
AWP	L70	AGUA DULCE AIRPARK	CA	73134.	23869.	0.	0.76	0.64
AWP	L65	PERRIS VALLEY	CA	71359.	23296.	0.	0.72	0.63
AWP	210	RANCHO CALIFORNIA	CA	51676.	43671.	0.	0.61	0.63
AWP	004	SELMA	CA	58780.	34986.	0.	0.67	0.62
AWP	052	SUTTER COUNTY	CA	63512.	26356.	0.	0.68	0.60
AWP	SVE	SUSANVILLE MUNI	CA	39351.	49017.	0.	0.55	0.59
AWP	SFR	SAN FERNANDO	CA	66840.	21818.	0.	0.63	0.59
AWP	061	CAMERON AIRPARK	CA	58243.	28655.	0.	0.64	0.58
AWP	054	WEAVERVILLE	CA	29375.	57871.	0.	0.49	0.58
AWP	L52	OCEANO-COUNTY	CA	65068.	21236.	0.	0.65	0.57
AWP	051	LINCOLN MUNI	CA	46886.	56891.	0.	0.46	0.56
AWP	042	WOODLAKE	CA	46161.	37559.	0.	0.56	0.56
AWP	209	PEARCE FIELD	CA	60872.	19867.	0.	0.64	0.54
AWP	Q94	RIO LINDA	CA	57627.	20022.	0.	0.61	0.52
AWP	037	HAIGH FIELD	CA	54494.	22573.	0.	0.59	0.51
AWP	APV	APPLE VALLEY	CA	58417.	19068.	0.	0.61	0.51
AWP	KIC	MESA DEL REY	CA	41960.	34898.	0.	0.52	0.51
AWP	L69	EL MIRAGE FLD	CA	55390.	18083.	0.	0.58	0.49
AWP	L01	CRYSTAL	CA	54309.	17729.	0.	0.55	0.48
AWP	031	HEALDSBURG MUNI	CA	52796.	19927.	0.	0.54	0.48
AWP	201	GANSNER FIELD	CA	21056.	50333.	0.	0.38	0.47
AWP	DAG	BARSTOW-DAGGETT	CA	51734.	16290.	11.	1.77	0.45
AWP	201	GREEN ACRES	CA	17664.	47571.	0.	0.33	0.43
AWP	CA35	SMITH RANCH	CA	49264.	16077.	0.	0.49	0.43
AWP	Q49	FIREBAUGH	CA	46016.	15017.	0.	0.46	0.41

AWP 059	CEDARVILLE	CA	9860.	51495.	0.	0.29	0.41
AWP 023	RANCHAERO	CA	25586.	35155.	0.	0.35	0.40
AWP Q31	SEQUOIA FIELD	CA	44483.	14521.	0.	0.47	0.39
AWP L00	ROSAFOND	CA	44492.	14526.	0.	0.45	0.39
AWP 060	CLOVERDALE MUNI	CA	35693.	21295.	0.	0.41	0.38
AWP Q96	NATOMAS FLD	CA	43447.	14183.	0.	0.44	0.38
AWP TNP	TWENTYNINE PALMS	CA	41960.	13695.	0.	0.44	0.37
AWP L06	DEATH VALLEY	CA	32061.	21708.	0.	0.37	0.36
AWP 020	KINGDON AIRPARK	CA	40420.	13192.	0.	0.40	0.36
AWP 002	BECKMOURTH	CA	28239.	26115.	0.	0.36	0.36
AWP 007	RANCHO MURIETA	CA	40838.	13326.	0.	0.41	0.36
AWP 026	LONE PINE	CA	14837.	38582.	0.	0.27	0.35
AWP 004	CORNING MUNI	CA	28368.	23721.	0.	0.35	0.35
AWP 203	ANGWIN	CA	36649.	13086.	0.	0.39	0.33
AWP G46	WEED	CA	28644.	20594.	0.	0.34	0.33
AWP 015	TURLOCK MUNI	CA	36702.	11979.	0.	0.38	0.32
AWP L84	LOST HILLS-KERN COUNTY	CA	36592.	11946.	0.	0.38	0.32
AWP Q38	DOS PALOS	CA	34714.	11333.	0.	0.35	0.31
AWP 016	GARBerville	CA	35569.	10956.	0.	0.35	0.30
AWP CA06	SCOTT VALLEY	CA	17851.	25133.	0.	0.26	0.29
AWP 068	MARIPOSA-YOSEMITE	CA	25737.	14231.	0.	0.29	0.27
AWP L94	FANTASY HAVEN	CA	30095.	9825.	0.	0.30	0.27
AWP MIT	SHAFTER-KERN COUNTY	CA	29318.	9570.	0.	0.31	0.26
AWP 301	GUSTINE	CA	29375.	9588.	0.	0.31	0.26
AWP Q61	GEORGETOWN	CA	28723.	9974.	0.	0.30	0.26
AWP 028	ELLS FIELD-WILLIITS MUNI	CA	29934.	9769.	0.	0.31	0.26
AWP Q32	GREAT WESTERN	CA	28815.	9405.	0.	0.30	0.25
AWP Q93	ENTERPRISE SKYPARK	CA	28219.	9212.	0.	0.28	0.25
AWP L05	KERN VALLEY	CA	20477.	16329.	0.	0.25	0.24
AWP 365	HAPPY CAMP	CA	14718.	19266.	0.	0.21	0.23
AWP 010	ALTA	CA	26201.	8551.	0.	0.26	0.23
AWP 086	TRINITY CENTER	CA	24675.	8053.	0.	0.26	0.22
AWP Q72	HAYFORK	CA	7358.	23771.	0.	0.15	0.21
AWP L80	HI DESERT	CA	23476.	7662.	0.	0.23	0.21
AWP Q40	SUNSET SKYRANCH	CA	23458.	7656.	0.	0.23	0.21
AWP L72	TRONA	CA	23553.	7689.	0.	0.25	0.21
AWP 014	TURLOCK AIRPARK	CA	23568.	7691.	0.	0.23	0.21
AWP Q84	MENDOTA	CA	22548.	7359.	0.	0.24	0.20
AWP Q88	PARADISE SKYPARK	CA	10999.	18053.	0.	0.17	0.19
AWP L22	YUCCA VALLEY	CA	22061.	7200.	0.	0.23	0.19
AWP L19	WASCO-KERN COUNTY	CA	21219.	6926.	0.	0.21	0.19
AWP 029	PATTERSON	CA	21724.	7092.	0.	0.22	0.19
AWP CLR	CALIPATRIA MUNI	CA	20112.	6566.	0.	0.21	0.18
AWP 097	RICHVALE	CA	20715.	6761.	0.	0.21	0.18
AWP 033	EUREKA MUNI	CA	16786.	5479.	0.	0.18	0.15
AWP CRO	CORCORAN	CA	17033.	5561.	0.	0.18	0.15
AWP 009	ROUND VALLEY	CA	16786.	5479.	0.	0.18	0.15
AWP 081	TULELAKE MUNI	CA	15160.	5981.	0.	0.16	0.14
AWP Q95	SHELTER COVE	CA	14131.	5167.	0.	0.14	0.13
AWP 009	SONOMA SKYPARK	CA	15229.	4971.	0.	0.15	0.13
AWP Q80	LODI AIRPARK	CA	13146.	4292.	0.	0.13	0.12
AWP L68	LAKE WOHLFORD RESORT	CA	11784.	3845.	0.	0.12	0.10
AWP L26	HESPERIA AIR LODGE	CA	10460.	3415.	0.	0.11	0.09
AWP L18	FALLBROOK COMMUNITY AIRPARK	CA	9460.	4309.	0.	0.10	0.09
AWP L02	SANTA SUSANA	CA	8667.	2830.	0.	0.09	0.08
AWP Q97	JENSEN FIELD	CA	9238.	3016.	0.	0.09	0.08
AWP RZH	TAFT-KERN COUNTY	CA	8146.	2660.	0.	0.09	0.07
AWP L17	QUARTZ HILL	CA	7603.	2482.	0.	0.08	0.07
AWP 1Q1	ECKERT FIELD	CA	7328.	2392.	0.	0.08	0.06
AWP Q21	BROWNSVILLE	CA					

AWP	074	REDDING SKY RANCH	REDDING	CA	4446.	3864.	0.	0.06	0.06
AWP	L93	VALLEY VIEW AIRPARK	RIDGECREST	CA	5179.	1690.	0.	0.05	0.05
AWP	Q17	BOONVILLE	BOONVILLE	CA	4099.	1338.	0.	0.04	0.04
AWP	Q82	ALPINE COUNTY	MARKLEEVILLE	CA	4103.	1339.	0.	0.04	0.04
AWP	Q69	OCEAN RIDGE	GUALALA	CA	3287.	2362.	0.	0.04	0.04
AWP	L53	SUN HILL RANCH	ADELANTO-HELENDL-SLVR	LKS	1224.	399.	0.	0.01	0.01
AWP	Q62	CARMEL VALLEY	CARMEL VALLEY	CA	1310.	428.	0.	0.01	0.01
AWP	Q92	RED FLAT AIR STRIP	RED BLUFF	CA	549.	179.	0.	0.01	0.00
AWP	NPS	FORD ISLAND ALF	HONOLULU	HI	299630.	97828.	0.	2.98	2.64
AWP	HDH	DILLINGHAM AIRFIELD	MOKULEIA	HI	289109.	94364.	0.	2.98	2.55
AWP	LNY	LANAI	LANAI CITY	HI	21697.	112443.	0.	0.73	0.89
AWP	HNM	HANA	HANA	HI	4161.	106721.	0.	0.55	0.74
AWP	MUE	WAIMEE-KOHALA	KAMUELA	HI	939.	105670.	0.	0.52	0.71
AWP	LUP	KALAUPAPA	KALAUPAPA	HI	1425.	105828.	0.	0.52	0.71
AWP	HKP	KAANAPALI	LAHAINA	HI	399.	105494.	0.	0.51	0.70
AWP	UPU	UPOLU	HAWI	HI	622.	98348.	0.	0.40	0.66
AWP	JON	JOHNSTON ATOLL	JOHNSTON ISLAND	HI	0.	21043.	0.	0.09	0.14
AWP	PAK	PORT ALLEN	HANAPEPE	HI	2546.	831.	0.	0.03	0.02
AWP	EKO	ELKO MUNI-J.C. HARRIS FIELD	ELKO	NV	625643.	211516.	605.	4.60*	5.56*
AWP	TPH	TONOPAH	TONOPAH	NV	155311.	131175.	151.	1.50*	1.90*
AWP	L15	LAS VEGAS-HENDERSON SKY HARBOR	LAS VEGAS	NV	200116.	75794.	0.	2.00	1.83
AWP	004	CARSON	CARSON CITY	NV	163381.	83721.	0.	1.71	1.64
AWP	WMC	WINNEMUCCA MUNI	WINNEMUCCA	NV	49496.	121519.	0.	2.00	1.14
AWP	4SD	RENO/STEAD	RENO	NV	106267.	54906.	0.	1.14	1.07
AWP	MEV	DOUGLAS COUNTY	MINDEN	NV	99282.	57696.	0.	1.07	1.04
AWP	BLD	BOULDER CITY MUNI	BOULDER CITY	NV	39398.	116672.	0.	0.84	1.04
AWP	LWL	HARRIET FIELD	WELLS	NV	75773.	43232.	73.	0.62*	0.79*
AWP	L0L	DERBY FIELD	LOVELOCK	NV	26019.	84242.	0.	0.53	0.73
AWP	BAM	LANDER COUNTY	BATTLE MOUNTAIN	NV	36020.	70555.	12.	0.47	0.71
AWP	HTH	HAWTHORNE MUNI	HAWTHORNE	NV	17114.	81479.	0.	0.44	0.66
AWP	FLX	FALLON MUNI	FALLON	NV	29300.	60236.	0.	0.47	0.59
AWP	043	YERINGTON MUNI	YERINGTON	NV	26373.	59278.	0.	0.44	0.57
AWP	05U	EUREKA	EUREKA	NV	8089.	68468.	0.	0.32	0.51
AWP	9U3	AUSTIN	AUSTIN	NV	2778.	28822.	0.	0.13	0.21
AWP	U08	OVERTON MUNI	OVERTON	NV	5522.	6956.	0.	0.07	0.08
AWP	BTY	BEATTY	BEATTY	NV	1926.	5579.	0.	0.04	0.05
AWP	0L9	ECHO BAY	OVERTON	NV	1410.	3137.	0.	0.02	0.03
AWP	10U	OWYHEE	OWYHEE	NV	113.	596.	0.	0.00	0.00
AWP	GSN	SAIPAN INTERNATIONAL	OBYAN	SP	1025.	105698.	0.	0.52	0.71
AWP	PPG	PAGO PAGO INTL	PAGO PAGO	SP	1607.	105888.	0.	0.52	0.71
AWP	TNI	WEST TINIAN	PEIPEINIMARU	SP	9.	105366.	0.	0.51	0.70
AWP	GRO	ROTA INTL	ROTA ISLAND	SP	18.	105369.	0.	0.51	0.70
AWP	PNI	PONAPE INTL	PONAPE ISLAND	SP	2055.	54862.	0.	0.21	0.38
AWP	YAP	YAP	YAP ISLAND	SP	2711.	51459.	0.	0.27	0.36
AWP	ROR	BABELTHAUP/KOROR	BABELTHAUP ISLAND	SP	895.	53725.	0.	0.19	0.36
AWP	Z07	TRUK INTL	MOEN ISLAND	SP	55.	36183.	0.	0.13	0.24
AWP	MAJ	MARSHALL ISLANDS INTL	MAJURO ATOLL	SP	322.	33687.	0.	0.15	0.23
AWP	Z08	OFU	OFU VILLAGE	SP	0.	26732.	0.	0.09	0.18

* BENEFIT/COST RATIO BEFORE PROXIMITY PENALTY OR REMOTENESS PREMIUM, IF ANY.

* AIRPORTS WITH INSTRUMENT APPROACH PROCEDURES FOR WHICH GENERAL AVIATION AND MILITARY ANNUAL INSTRUMENT APPROACHES (AIA'S) WERE COMPUTED WITH THE SCI MODEL USING NATIONAL NORMS FOR PIFR (13.5X) AND PC (4.95X) ARE IDENTIFIED BY ***. FOR OTHER AIRPORTS WITH INSTRUMENT APPROACH PROCEDURES, AIA'S WERE COMPUTED WITH THE SCI MODEL USING VALUES FOR PIFR AND PC BASED ON SITE-SPECIFIC MINIMA IN THE SCI FILE. FOR AIRPORTS WITHOUT RECORDED AIA'S IN THE TAF, THE SCI MODEL USED :0 PREDICT AIA'S WAS SUPPRESSED.

RECAP - FIGURE 34-A

Region	State	Number of Sites With Phase II Benefit/Cost Ratios of						2.00 or Greater	Total	
		Less than .50	.50 to .99	1.00 to 1.49	1.50 to 1.99					
AAL	AK	114	79	8	4			5	210	
	ACE	IA	40	18	16	7			17	98
		KS	40	13	4	6			13	76
		MO	45	17	9	3			16	90
		NE	41	11	1	1			9	63
		166	59	30	17			55	327	
AEA	DE	4	1	1	0			3	9	
	MD	7	7	3	2			11	30	
	NJ	13	11	4	3			15	46	
	NY	46	11	8	9			18	92	
	PA	62	16	7	6			25	116	
	VA	23	9	8	6			7	53	
	WV	14	4	1	0			3	22	
		169	59	32	26			82	368	
AGL	IL	32	11	7	6			27	83	
	IN	34	15	9	6			24	88	
	MI	51	11	8	9			33	112	
	MN	57	7	7	6			19	96	
	ND	36	0	1	1			2	40	
	OH	59	26	18	12			28	143	
	SD	33	1	0	0			6	40	
	WI	45	16	8	5			23	97	
		347	87	58	45			162	699	
ANE	CT	4	2	2	1			3	12	
	MA	12	3	1	5			9	30	
	ME	14	2	4	5			7	32	
	NH	4	2	0	1			5	12	
	RI	1	0	3	0			2	6	
	VT	5	3	2	0			1	11	
		40	12	12	12			27	103	

Region	State	Less than .50	.50 to .99	1.00 to 1.49	1.50 to 1.99	2.00 or Greater	Total
ANM	CO	29	12	3	3	12	59
	ID	27	5	5	2	1	40
	MT	38	4	3	2	3	50
	OR	31	9	6	4	12	62
	UT	17	11	6	3	2	39
	WA	55	12	4	4	13	88
	WY	10	8	4	0	8	30
		<u>207</u>	<u>61</u>	<u>31</u>	<u>18</u>	<u>51</u>	<u>368</u>
ASO	AL	31	9	1	4	1	60
	FL	22	7	11	6	23	69
	GA	52	14	7	7	6	86
	KY	24	7	2	2	6	41
	MS	33	7	4	1	12	57
	NL	26	9	5	4	14	58
	PR	1	3	0	1	0	5
	SC	13	10	8	1	6	38
	TN	25	23	7	1	6	62
		<u>227</u>	<u>89</u>	<u>45</u>	<u>27</u>	<u>88</u>	<u>476</u>
	AR	19	10	13	4	12	58
	LA	27	4	4	5	4	44
	NM	23	4	3	4	4	38
	OK	45	13	9	3	16	86
	TX	154	39	13	9	38	253
		<u>268</u>	<u>70</u>	<u>42</u>	<u>25</u>	<u>74</u>	<u>479</u>
AWP	AZ	24	15	6	4	6	55
	CA	76	41	22	14	33	186
	HI	2	6	0	0	2	10
	NV	5	7	4	3	1	20
	SP	6	4	0	0	0	10
		<u>113</u>	<u>73</u>	<u>32</u>	<u>21</u>	<u>42</u>	<u>281</u>
GRAND TOTAL		1,651	589	290	195	586	3,311

1,071

FIGURE 34-B

RESULTS OF APPLYING ALOS CRITERIA FOR NON-TOWERED AIRPORTS TO TENTATIVELY-IDENTIFIED ATCT DISCONTINUANCE CANDIDATES ##

LOCID	AIRPORT NAME	CITY	ST	LC SAFETY BENS	LC EFFICY BENS	GA+ML AIA'S YR 1	PHASE I B/C#	PHASE II B/C#
ADM	ARDMORE MUNI	ARDMORE	OK	758371.	133080.	556.	3.33	5.92
AKR	AKRON FULTON INTERNATIONAL	AKRON	OH	894317.	155667.	764.	5.28	6.93
ALW	WALLA WALLA CITY COUNTY	WALLA WALLA	WA	969453.	268311.	741.	5.23	8.22
ANM	WEST MEMPHIS MUNI	WEST MEMPHIS	AR	870401.	150900.	690.	4.60	6.79
BEH	ROSS FIELD	BENTON HARBOR	MI	454976.	171286.	357.	2.78	4.16
BMG	MONROE COUNTY	BLOOMINGTON	IN	197102.	155152.	698.	5.22	2.34
CGI	CAPE GIRARDEAU MUNI	CAPE GIRARDEAU	MO	735777.	230695.	613.	4.55	6.42
CGX	MERRILL C MEIGS	CHICAGO	IL	177269.	162590.	0.	2.36	2.26
CIC	CHICO MUNI	CHICO	CA	1048300.	283375.	902.	6.31	8.85
CKB	BENEDUM	CLARKSBURG	WV	727561.	229499.	659.	4.59	6.36
CRE	GRAND STRAND	NORTH MYRTLE BEACH	SC	1151864.	271688.	838.	6.36	9.46
CSM	CLINTON-SHERMAN	CLINTON	OK	353282.	83437.	352.	2.09	2.90
DBQ	DUBUQUE MUNI	DUBUQUE	IA	970361.	269761.	861.	6.06	8.24
DKX	KNOXVILLE DOWNTOWN ISLAND	KNOXVILLE	TN	918902.	164780.	692.	4.89	7.20
DNV	VERMILION COUNTY	DANVILLE	IL	405923.	174191.	341.	2.70	3.85
ESF	ESLER REGIONAL	ALEXANDRIA	LA	556003.	197194.	478.	3.57	5.00
EWN	SIMMONS NOTT	NEW BERN	NC	487996.	191669.	375.	3.00	4.52
FCH	FRESNO-CHANDLER DOWNTOWN	FRESNO	CA	990545.	271524.	743.	5.83	8.39
FLO	FLORENCE CITY-COUNTY	FLORENCE	SC	790317.	237298.	650.	4.18	6.83
GBG	GALESBURG MUNI	GALESBURG	IL	566238.	200551.	504.	3.78	5.09
HKY	HICKORY MUNI	HICKORY	NC	661797.	216508.	551.	4.12	5.84
HLG	WHEELING OHIO CO	WHEELING	WV	699725.	214815.	478.	3.33	6.08
HOB	LEA COUNTY/HOBBS/	HOBBS	NM	505771.	189994.	472.	4.09	4.62
HOT	MEMORIAL FIELD	HOT SPRINGS	AR	774110.	235475.	543.	4.38	6.71
IDA	FANNING FIELD	IDAHO FALLS	ID	619977.	209414.	573.	4.08	5.51
ISO	EASTERN RGNL JETPORT AT STALLINGS FLD	KINSTON	NC	579932.	201877.	580.	3.78	5.19
LEB	LEBANON REGIONAL	LEBANON	NH	588202.	205464.	521.	3.77	5.27
LRD	LAREDO INTERNATIONAL	LAREDO	TX	769474.	236046.	648.	5.10	6.68
LWB	GREENBRIER VALLEY	LEWISBURG	WV	292801.	154220.	236.	2.09	2.97
MZ	MAYAGUEZ AIRFIELD	MAYAGUEZ	PR	207532.	139680.	142.	0.69	2.31
MGW	MORGANTOWN MUNI-WALTER L. BILL HART FLD	MORGANTOWN	WV	719720.	226662.	694.	4.89	6.29
MOT	MINOT INTL	MINOT	ND	665622.	214999.	552.	3.99	5.85
MVY	MARTHAS VINEYARD	MARTHAS VINEYARD	MA	545746.	195888.	416.	3.63	4.93
MVA	WILLIAMSON COUNTY	MARYSVILLE	IL	826841.	247738.	669.	4.79	7.14
MYA	YUBA COUNTY	MARYSVILLE	CA	1033805.	253318.	911.	6.65	8.55
ONB	OWENSBORO-DAVIESS COUNTY	OWENSBORO	KY	767315.	234754.	680.	5.18	6.66
PAB	BARKLEY REGIONAL	PADUCAH	KY	482785.	185554.	387.	2.96	4.44
PBF	GRIDER FIELD	PINE BLUFF	AR	635914.	176968.	602.	4.67	5.40
PSE	MERCEDITA	POHCE	PR	209297.	137780.	148.	1.24	2.31
PVM	HALE COUNTY	PLAINVIEW	TX	984155.	164955.	746.	3.21	7.64
SAF	SANTA FE COUNTY MUNI	SANTA FE	NM	956932.	261370.	835.	6.03	8.09
SPA	SPARTANBURG DOWNTOWN MEMORIAL	SPARTANBURG	SC	859682.	249829.	627.	4.91	7.37
SSI	MALCOLM MCKINNON	BRUNSWICK	GA	355961.	63246.	231.	2.19	2.79
STJ	ROSECRANS MEMORIAL	ST JOSEPH	MO	848617.	180073.	640.	3.10	6.83

	DADE-COLLIER TRAINING AND TRANSITION	MIAMI	FL	210605.	38641.	129.	0.96	1.66
TNT	PAGO PAGO INTL	PAGO PAGO	SP	21813.	108600.	61.	0.68	0.87
TUT	TEXARKANA MUNI-WEBB FLD	TEXARKANA	AR	728486.	227537.	743.	5.25	6.35
TXK	VALDEZ NR 2	VALDEZ	AK	88310.	120234.	63.	0.85	1.39
VDZ	VALDOSTA MUNI	VALDOSTA	GA	678770.	217985.	525.	4.16	5.96
VLD	ENID WOODRING MUNI	ENID	OK	892061.	252859.	838.	6.20	7.61
WDG								

RECAP

TOTAL LOCATIONS HAVING PHASE II BENEFIT/COST RATIOS OF LESS THAN .50	0.
TOTAL LOCATIONS HAVING PHASE II BENEFIT/COST RATIOS FROM .50 TO .99	1.
TOTAL LOCATIONS HAVING PHASE II BENEFIT/COST RATIOS FROM 1.00 TO 1.49	1.
TOTAL LOCATIONS HAVING PHASE II BENEFIT/COST RATIOS FROM 1.50 TO 1.99	1.
TOTAL LOCATIONS HAVING PHASE II BENEFIT/COST RATIOS OF 2.00 OR GREATER	47.
TOTAL LOCATIONS	50.

* BENEFIT/COST RATIO BEFORE PROXIMITY PENALTY OR REMOTENESS PREMIUM, IF ANY.

** THE FOLLOWING LOCATIONS ARE EXCLUDED FROM THIS LIST BECAUSE THE NATIONAL WEATHER SERVICE IS CURRENTLY RESPONSIBLE FOR THE WEATHER OBSERVATION FUNCTION: ACT, AHN, MCN AND PDT.

CHAPTER VII - SENSITIVITY ANALYSIS

A. Introduction

In the cost-effectiveness analysis of AWOS at FAA towered airports (described in Section B of Chapter IV) and the benefit/cost analysis of AWOS at non-towered and non-federal towered airports (described in Section C of Chapter IV), there are a number of constants and variables which are used to quantify benefits and costs. While some of these parameters are known with relative certainty, others are uncertain and may be characterized by judgment. This chapter addresses the sensitivity of the results of these analyses to variations in those parameters which appear to be the most significant or sensitive.

B. FAA Towered Airports

FAA towered airports where the surface weather observation function is the responsibility of the FAA automatically qualify for AWOS establishment, except locations identified as ATCT discontinuance candidates. This policy rests on the fact that weather observations are required by regulation in control zones and the life-cycle cost of AWOS at such locations is less than those of acceptable manual weather observation system alternatives. Priority of AWOS establishment at these locations will be given to part-time facilities, followed by full-time facilities, in recognition of the relatively greater benefits of AWOS when facilities are closed.

Because the unit costs used to develop the life-cycle costs of AWOS in this report are preliminary estimates, it is important that a sensitivity analysis be conducted to support the policy of automatic qualification for AWOS at these airports. This sensitivity analysis was approached by asking the question: "What would happen to the life-cycle costs of AWOS if the investment and annually recurring operations and maintenance costs were more than anticipated?" Assuming as much as a 50 percent increase in investment cost and a 200 percent increase in annual recurring costs of AWOS, a life-cycle cost of \$365,472 results, a value still approximately 44 percent less than other acceptable options of collecting and disseminating weather data at locations with an active FAA ATCT. Even after ignoring the costs and alleged cost savings of observation personnel in light of the arguments outlined in Chapter IV and applying the same variations, the life-cycle cost of AWOS is still approximately 20 percent less than the acceptable manual options.

c. Non-Towered and Non-Federal Airports

In the case of the benefit/cost analysis for establishment of AWOS at non-towered and non-federal towered airports, the sensitivity of the following parameters were examined: probability of weather below VFR minima, probability of weather below IFR minima, number of projected annual general aviation instrument approaches, probability of a ceiling/visibility-related accident, probability of a wind-related accident, annual benefit to existing commercial weather observation service (SAWRS) operation, probability of averting an instrument flight disruption, life-cycle cost, and the value of a statistical life. The results of introducing specific percentage increases and decreases to each of these parameters, while holding all other parameters constant, for a sample of selected airports with Phase II benefit/cost ratios of .80 (LNL), .90 (SJN), 1.00 (SMN), 1.10 (GTR) and 1.20 (BGD) are outlined below in Figure 35. Additionally, Figure 35 outlines the aggregate number of qualifying non-towered and non-federal towered airports corresponding to each parameter variation.

FIGURE 15

Sensitivity Analysis

	<u>Airport With B/C Ratio Of:</u>					<u>Total Number of Qualifying</u>	
	<u>.80</u>	<u>.90</u>	<u>1.00*</u>	<u>1.10*</u>	<u>1.20</u>	<u>Non-Towered/Non-Federal Towered</u>	<u>Civil Airports (B/C = 1.0 or more)</u>
<u>Life-Cycle Cost</u>							
50% decrease	1.61	1.80	2.01	2.20	2.39	1,638	(+53%)
20% decrease	1.00	1.12	1.26	1.38	1.50	1,239	(+16%)
10% decrease	.89	1.00	1.12	1.22	1.33	1,147	(+ 7%)
No Change (\$150,505)	.80	.90	1.00	1.10	1.20	1,071	
10% increase	.73	.82	.91	1.00	1.09	989	(- 8%)
20% increase	.67	.75	.84	.92	1.00	914	(-15%)
50% increase	.54	.60	.67	.73	.80	768	(-28%)
<u>Annual Benefit to</u> <u>Air Carrier and Air</u> <u>Taxi User Classes</u>							
50% decrease	.77	.62	.65	.75	.93	954	(-11%)
20% decrease	.79	.79	.86	.96	1.09	1,013	(- 5%)
10% decrease	.80	.84	.93	1.03	1.14	1,036	(- 3%)
No Change	.80	.90	1.00	1.10	1.20	1,071	
10% increase	.81	.95	1.07	1.17	1.25	1,084	(+ 1%)
20% increase	.82	1.01	1.14	1.24	1.30	1,115	(+ 4%)
50% increase	.84	1.17	1.35	1.45	1.46	1,207	(+13%)
<u>Probability of Weather</u> <u>Below VFR Minima</u>							
50% decrease	**	.80	1.00	1.10	1.08	319	(-70%)
20% decrease	.17	.86	1.00	1.10	1.15	580	(-46%)
10% decrease	.38	.88	1.00	1.10	1.17	781	(-27%)
No Change	.80	.90	1.00	1.10	1.20	1,071	
10% increase	1.71	.92	1.00	1.10	1.22	1,346	(+26%)
20% increase	3.80	.94	1.00	1.10	1.24	1,426	(+33%)
50% increase	46.21	1.00	1.00	1.10	1.31	1,468	(+37%)
<u>Value of a Statistical</u> <u>Life</u>							
50% decrease	.54	.81	.95	1.03	1.05	897	(-16%)
20% decrease	.70	.86	.98	1.07	1.14	995	(- 7%)
10% decrease	.75	.88	.99	1.09	1.17	1,034	(- 3%)
No Change (\$580,000)	.80	.90	1.00	1.10	1.20	1,071	
10% increase	.86	.92	1.00	1.11	1.23	1,090	(+ 2%)
20% increase	.91	.93	1.03	1.13	1.26	1,112	(+ 4%)
50% increase	1.07	.99	1.06	1.17	1.35	1,193	(+11%)

	Airport With B/C Ratio Of:					Total Number of Qualifying Non-Towered/Non-Federal Towered Civil Airports (B/C = 1.0 or more)	
	.80	.90	1.00*	1.10*	1.20		
<u>No. of Projected Annual</u>							
<u>GA Instrument Approaches</u>							
50% decrease	.50	.83	1.00	1.10	1.13	928	(-13%)
20% decrease	.68	.87	1.00	1.10	1.17	1,007	(- 6%)
10% decrease	.74	.88	1.00	1.10	1.18	1,031	(- 4%)
No Change	.80	.90	1.00	1.10	1.20	1,071	
10% increase	.86	.91	1.00	1.10	1.21	1,079	(+ 1%)
20% increase	.92	.92	1.00	1.10	1.22	1,093	(+ 2%)
50% increase	1.10	.96	1.00	1.10	1.26	1,134	(+ 6%)
 <u>Probability of Averting</u>							
<u>a GA Wind-Related Accident</u>							
50% decrease	.75	.82	.89	.95	1.00	914	(-15%)
20% decrease	.78	.87	.96	1.04	1.12	1,015	(- 5%)
10% decrease	.79	.88	.98	1.07	1.16	1,034	(- 3%)
No Change (3.704 x 10 ⁻⁶ per GAITN or MILITN)	.80	.90	1.00	1.10	1.20	1,071	
10% increase	.81	.91	1.03	1.13	1.24	1,082	(+ 1%)
20% increase	.82	.93	1.05	1.16	1.28	1,113	(+ 4%)
50% increase	.85	.98	1.11	1.25	1.40	1,183	(+10%)
 <u>Probability of Averting</u>							
<u>a GA Ceiling/Visibility-</u>							
<u>Related Accident</u>							
50% decrease	.54	.84	1.00	1.10	1.14	950	(-11%)
20% decrease	.70	.88	1.00	1.10	1.17	1,018	(- 5%)
10% decrease	.75	.89	1.00	1.00	1.19	1,034	(- 3%)
No Change (1.387 x 10 ⁻⁶ per GAITN or MLITN)	.80	.90	1.00	1.10	1.20	1,071	
10% increase	.86	.91	1.00	1.10	1.21	1,077	(+ 1%)
20% increase	.91	.92	1.00	1.10	1.22	1,091	(+ 2%)
50% increase	1.07	.95	1.00	1.10	1.25	1,130	(+ 6%)
 <u>Probability of Weather</u>							
<u>Below IFR Minima</u>							
50% decrease	1.15	.93	1.00	1.10	1.25	1,278	(+19%)
20% decrease	1.05	.91	1.00	1.10	1.22	1,245	(+16%)
10% decrease	.97	.90	1.00	1.10	1.21	1,205	(+13%)
No Change	.80	.90	1.00	1.10	1.20	1,071	
10% increase	.44	.89	1.00	1.10	1.19	825	(-23%)
20% increase	**	.88	1.00	1.10	1.18	394	(-63%)
50% increase	**	.86	1.00	1.10	1.15	214	(-80%)

	Airport With B/C Ratio Of:					Total Number of Qualifying	
	.80	.90	1.00*	1.10*	1.20	Non-Towered/Non-Federal Towered	Civil Airports (B/C = 1.0 or more)
<u>Probability of Averting</u>							
<u>an Instrument Flight</u>							
<u>Disruption</u>							
50% decrease	.77	.89	1.00	1.10	1.19	1,044	(- 3%)
20% decrease	.79	.89	1.00	1.10	1.19	1,051	(- 2%)
10% decrease	.80	.90	1.00	1.10	1.20	1,054	(- 2%)
No Change (.10)	.80	.90	1.00	1.10	1.20	1,071	
10% increase	.81	.90	1.00	1.10	1.20	1,072	(0%)
20% increase	.82	.90	1.00	1.10	1.20	1,077	(+ 1%)
50% increase	.84	.91	1.00	1.10	1.21	1,088	(+ 2%)
<u>Proximity Penalty and</u>							
<u>Remoteness Premium</u>							
<u>(Applied to All Sites)</u>							
Proximity Penalty (50%)	.40	.45	.50	.55	.60	569	(-47%)
No Penalty/Premium	.80	.90	1.00	1.10	1.20	1,071	
Remoteness Premium (25%)	1.00	1.12	1.26	1.38	1.50	1,239	(+16%)
<u>Annual Aircraft</u>							
<u>Operations</u>							
50% decrease	.75	.79	.95	1.08	1.07	1,001	(- 7%)
20% decrease	.78	.86	1.00	1.09	1.15	1,040	(- 3%)
10% decrease	.79	.88	1.00	1.10	1.17	1,047	(- 2%)
No Change	.80	.90	1.00	1.10	1.20	1,071	
10% increase	.81	.92	1.01	1.11	1.22	1,084	(+ 1%)
20% increase	.82	.94	1.01	1.11	1.25	1,094	(+ 2%)
50% increase	.86	1.00	1.02	1.12	1.32	1,128	(+ 5%)

* SMN and GTR do not have approved instrument approach procedures. This fact explains why their benefit/cost ratios do not change with variations in certain parameters.

** Negative or nonsensical results produced because interrelationship between PIFR and PC in the SCI regression model used to predict number of annual instrument approaches.

CHAPTER VIII - IMPACT ANALYSIS

It is impossible, at least with a high degree of accuracy, to assess the impact of the criteria on agency resources as required by Order 1320.1 because (1) it is presently uncertain which specific AWOS configuration will be justified for each qualifying airport (i.e., differing requirements for various airports may result in implementation of various AWOS sensor configurations), and (2) meeting candidacy levels will not mean automatic qualification since benefit/cost screening is but one of several inputs to the FAA decisionmaking process relative to investment in facilities and equipment. Aside from these uncertainties, this impact analysis is based on installations of AWOS with sensors for wind, temperature, dew point, altimeter setting, ceiling, visibility and liquid precipitation. While this is the typical AWOS configurations envisioned by the AWOS Program Office as of the date of this report, future configurations may include additional or fewer sensors. For example, a cloud height (ceiling) sensor may not be justified at certain locations in close proximity to another observation site, while additional sensors, such as for freezing precipitation and thunderstorms, may be added if cost effective.

Based on these assumptions, extrapolations of the Terminal Area Forecasts and ignoring the impact of any proximity penalties or remoteness premiums as provided for in Chapter IV-C-4, Figure 34-A shows 1,071 non-towered and non-federal towered airports locations with benefit/cost ratios of 1.0 or greater. All FAA towered airports where the surface weather observation function is the responsibility of the FAA, other than tower discontinuance candidates, or approximately 254 airports, automatically qualify for AWOS. Priority of AWOS establishment at FAA towered airports will be given to part-time facilities, followed by full-time facilities, in recognition of the relatively greater benefits of AWOS when facilities are closed. Figure 34-B shows 49 of 50 tentatively-identified FAA ATCT discontinuance candidates with benefit/cost ratios of 1.0 or more. Applying average respective life-cycle costs of approximately \$165,300 and \$150,500 to 254 towered and 1,120 non-towered, non-federal towered, and ATCT discontinuance candidate locations results in approximately \$210.5 million (1981 dollars). Approximately 60 percent of the investment is incurred for facilities and equipment in the acquisition year. The remainder represents discounted operations and maintenance costs over an estimated 15 year economic life. These impact assessments may be understated after allowing for remoteness premiums and may be overstated after allowing for proximity penalties.

APPENDIX A-1

Statistical Summary of Accident Briefs-Weather Observation Unavailable^{1/}

(Calendar Year 1979; Approach or Landing Phases of Operation)

"Modified" Cause/ Factor ^{2/}	NTSB File No.	No. of Injuries				Degree of Aircraft Damage			
		Fatal	Ser- ious	Minor	None	Destroyed	Substantial	Minor	No
Unfavorable	0008				1		X		
Winds or	0069				2		X		
Wrong Runway	0117				1		X		
	0128				1		X		
	0134				1		X		
	0154				3		X		
	0176				2		X		
	0204				1		X		
	0205				1		X		
	0228				2		X		
	0251				4		X		
	0259				1		X		
	0267				2		X		
	0300				1		X		
	0334				1		X		
	0335				2		X		
	0336				2		X		
	0341				3		X		
	0350				2		X		
	0423				1		X		
	0458				2		X		
	0464				1		X		
	0495				1		X		
	0590	2				X			
	0633				1		X		
	0669				2		X		
	0685				1		X		
	0711				1		X		
	0718			2			X		
	0721				1		X		
	0725				1		X		
	0753				3		X		
	0762				1		X		
	0784				1		X		
	0813				3		X		
	0831				2		X		
	0845				1		X		
	0860				3		X		
	0905		1	4			X		
	0918				1		X		
	0921				2		X		
	0937		1		2				
	0972				1		X		
	0996				4		X		
	1008				1		X		

APPENDIX A-1 (Continued)

"Modified" Cause/ Factor ² /	NTSB File No.	No. of Injuries				Degree of Aircraft Damage			
		Fatal	Ser- ious	Minor	None	Destroyed	Substantial	Minor	None
Unfavorable	1009				3		X		
Winds or	1013				2		X		
Wrong Runway	1015				1		X		
(Cont'd.)	1016				1		X		
	1028				1		X		
	1042	2				X			
	1046	1	1			X			
	1103				1		X		
	1142				1		X		
	1161				1		X		
	1183				1		X		
	1185				1		X		
	1233			2		X			
	1252		1				X		
	1339				1		X		
	1363				1		X		
	1365				2		X		
	1375				2		X		
	1416				1		X		
	1443				4		X		
	1450				2		X		
	1473			4			X		
	1483			1	2		X		
	1574				2		X		
	1624				1		X		
	1636				2		X		
	1637				1		X		
	1661				1		X		
	1674		1			X			
	1701				1		X		
	1746				2		X		
	1817				4		X		
	1829			1		X			
	1830				2		X		
	1849				1		X		
	1873			4		X			
	1881				1		X		
	1896				1	X			
	1910				1		X		
	1914		2				X		
	1922				2		X		
	1944		1	1			X		
	2006			3	3		X		
	2021				3		X		
	2127			1			X		
	2202				1		X		
	2205			3			X		
	2251				1		X		
	2271				6		X		
	2309				4		X		
	2318				1		X		
	2329				2		X		
	2402				1		X		

APPENDIX A-1 (Continued)

"Modified" Cause/ Factor ^{2/}	NTSB File No.	No. of Injuries				Degree of Aircraft Damage			
		Fatal	Ser- ious	Minor	None	Destroyed	Substantial	Minor	None
Unfavorable	2412				3		X		
Winds or	2440				1		X		
Wrong Runway	2457				1		X		
(Cont'd)	2514				2		X		
	2537	1				X			
	2561				2		X		
	2598				1		X		
	2632			1	1		X		
	2636				3		X		
	2660				1		X		
	2747				2		X		
	2750				1		X		
	2812			1	2		X		
	2911				1		X		
	2918				2		X		
	3023				3		X		
	3202		1			X			
	3204				1		X		
	3214				2		X		
	3221		1				X		
	3287		2				X		
	3312			1	2		X		
	3314				1	X			
	3315				2		X		
	3385				2		X		
	3397				1		X		
	3408				2		X		
	3489				1		X		
	3494				2	X			
	3505			1		X			
	3527				1		X		
	3548				2		X		
	3555				2	X			
	3578				3		X		
	3687		2				X		
	3711				1		X		
	3731				1		X		
	3771				1		X		
	3775				2		X		
	3868				2		X		
	3939				1		X		
	4016					X			
Subtotals	140	2	1	30	200	15	124	0	1
Low Ceiling/	0091				2		X		
Visibility:	0119				5		X		
IFR Approach	0139		1			X			
	0564	1				X			
	0607	4				X			
	0778			2			X		
	0808	4					X		
	0913		4		2	X			
	1086	1				X			
	1951			2	1	X			

APPENDIX A-1 (Continued)

"Modified" Cause/ Factor ² /	NTSB File No.	No. of Injuries				Degree of Aircraft Damage			
		Fatal	Ser- ious	Minor	None	Destroyed	Substantial	Minor	None
Low Ceiling/	2148				4		X		
Visibility:	2423				4		X		
IFR Approach	2595				5		X		
(Cont'd)	3266	3				X			
	3366	4				X			
	3529	1				X			
	3620	2	1			X			
	3712	1				X			
	3858				4		X		
	3905	2				X			
	3988		1				X		
	3989	2				X			
	3993	1				X			
	4006	2				X			
	4010	2	1			X			
Subtotals	25	30	8	4	27	16	9	0	0
Thunder-	1700			1	1		X		
storms	2591				4		X		
Subtotals	2	0	0	1	5	0	2	0	0
Temperature/	1376				4		X		
Dew Point	1536			2			X		
	1771			2			X		
	3252				2		X		
	3378				1		X		
Subtotals	5	0	0	4	7	0	5	0	0
Rain, Hydro-	1261		2			X			
planning, or	2122				8		X		
Wet Runway	2903				2		X		
	3025				2		X		
Subtotals	4	0	2	0	12	1	3	0	0
Totals	176	38	25	39	251	32	143	0	1

APPENDIX A-2

Statistical Summary of Accident Briefs - Weather Observation Available^{1/}
 (Calendar Year 1979; Approach or Landing Phases of Operation)

"Modified" Cause/ Factor ^{2/}	NTSB File No.	No. of Injuries				Degree of Aircraft Damage			M
		Fatal	Ser- ious	Minor	None	Destroyed	Substantial	Minor	
Unfavorable	0106				1		X		
Winds or	0153				1		X		
Wrong Runway	0165				3		X		
	0212				1		X		
	0269				1		X		
	0343				1		X		
	0383				1		X		
	0386				1		X		
	0490			1	2		X		
	0567				1		X		
	0680				1		X		
	0742				1		X		
	0881				3		X		
	0904				1		X		
	0979			1			X		
	1024				2		X		
	1041			1	1		X		
	1057				1		X		
	1104		1						X
	1113				4		X		
	1184			3	1		X		
	1211			1			X		
	1341				1		X		
	1364			1	2		X		
	1722				2		X		
	1828			2			X		
	2043				2		X		
	2176				1		X		
	2260			4			X		
	2343				1		X		
	2413			1			X		
	2693		2				X		
	2804				1		X		
	2808				1		X		
	2855				2		X		
	3311				1		X		
	3455				2		X		
	3566			1	1		X		
	3641				1		X		
	3690				4		X		
Subtotals	40	0	3	17	50	0	38	1	

APPENDIX A-2 (Continued)

"Modified" Cause/ Factor ² /	NTSB File No.	No. of Injuries				Degree of Aircraft Damage			
		Fatal	Ser- ious	Minor	None	Destroyed	Substantial	Minor	No
Low Ceiling/ Visibility: IFR Approach	0109			3	3		X		
	0112		3			X			
	0313			1		X			
	0542		4				X		
	0879	3				X			
	0888	2				X			
	0911	1				X			
	1430		1				X		
	1459			3			X		
	1808	1				X			
	2114	4				X			
	2153	3					X		
	2658	3	2			X			
	2780	2				X			
	2831			3	2		X		
	2966			2		X			
	2996	3				X			
	3038	2				X			
	3231	1				X			
	3390	3	2			X			
	3392				2	X			
	3499		2			X			
	3644			1	7	X			
	3692	1				X			
	3886				1	X			
	3974	2	3			X			
	3981	2					X		
Subtotals	27	33	17	13	15	19	X 8	0	0
Thunderstorms	3375				1		X		
Subtotals	1	0	0	0	1	0	X 1	0	0
Temperature/ Dew Point	2627				4		X		
	3362				2		X		
Subtotals	2	0	0	0	6	0	X 2	0	0
Rain, Hydro- planing, or Wet Runway	3329				2		X		
Subtotals	1	0	0	0	2	0	1	0	0
Totals	71	33	20	30	74	19	50	1	1

APPENDIX A-3 - RECAP

247 total accidents (176 without WX observation; 71 with weather observation)
71 fatalities (.287 per accident or .139 probability per occupant)
45 serious injuries (.182 per accident or .088 probability per occupant)
69 minor injuries (.279 per accident or .135 probability per occupant)
325 no injuries (1.316 per accident or .637 probability per occupant)
51 aircraft totally destroyed (.206 probability per accident)
193 aircraft substantially damaged (.777 probability per accident)
1 aircraft minor damage (.004 probability per accident)
2 aircraft no damage (.008 probability per accident)

1/Source: Reference 37.

2/Modified in the sense that only one cause or factor was used to categorize an accident. Whenever more than one cause or factor was cited, that which appeared to have weighed most heavily in the accident sequence was used.

APPENDIX B

Critical Values

Critical Value Element	Base Year Value/	Inflator Ratio	1981 Value
Value of a Statistical Life	\$530,000 (80\$)	138.92/127.33/	\$ 580,000 ⁴ /
Unit Costs of Statistical Aviation Injuries:			
Serious			
Minor	38,000 (80\$) 15,000 (80\$)	See Footnote 5. See Footnote 6.	\$ 42,000 15,000
Unit Replacement and Restoration Costs of General Aviation Aircraft (Excluding Turbojets/Fans):			
Replacement Restoration	\$ 37,000 (78\$) 12,000 (78\$)	235.42/173.58/	\$ 50,000 ² / 16,000 ² /
Value of Time of Air Travelers Per Hour	17.50 (80\$)	138.92/127.33/	19.00 ¹⁰ /
Variable Operating Costs of General Aviation Aircraft (Per Airborne Hour)	Fuel & Main- Oil Tenance		
Single-engine piston, 1-3 seats	\$ 9.93 + \$ 6.24 (78\$)	See Footnote 11.	\$ 29.00 ¹² /
Single-engine piston, 4 + seats	\$ 12.41 + \$ 9.53 (78\$)	See Footnote 11.	\$ 38.00 ¹² /
Twin-engine piston, under 12,500 TOGW	\$ 25.12 + \$ 41.02 (78\$)	See Footnote 13.	\$ 104.00 ¹² /
Twin-engine turboprop, under 12,500 TOGW	\$ 54.61 + \$ 77.35 (78\$)	See Footnote 14.	\$ 216.00 ¹² /
Twin-engine turboprop, over 12,500 TOGW	\$198.25 + \$180.30 (78\$)	See Footnote 14.	\$ 655.00 ¹² /
Twin-engine turbojet/fan, under 20,000 TOGW	\$252.05 + \$162.28 (78\$)	See Footnote 14.	\$ 748.00 ¹² /
Twin-engine turbojet/fan, over 20,000 TOGW	\$354.10 + \$203.76 (78\$)	See Footnote 14.	\$1,020.00 ¹² /
Multi-engine turbojet/fan, over 20,000 TOGW	\$388.26 + \$461.22 (78\$)	See Footnote 14.	\$1,421.00 ¹² /
Piston rotorcraft	\$ 13.73 + \$ 25.19 (78\$)	See Footnote 13.	\$ 61.00 ¹² /
Turbine rotorcraft	\$ 22.44 + \$ 55.79 (78\$)	See Footnote 14.	\$ 119.00 ¹² /
Weighted Total			\$ 84.00 ¹⁵ /

Footnotes to Appendix B

- 1/ Source: Reference 9.
- 2/ BLS index of adjusted hourly earnings, 1981 (1977=100).
- 3/ BLS index of adjusted hourly earnings, 1980 (1977=100).
- 4/ Rounded to nearest \$10,000.
- 5/ Labor or earnings related cost in 1980 (\$28,480) x Ratio of 1981 to 1980 index of adjusted hourly earnings where 1977=100 (138.9/127.3) = \$31,075. Medical related costs in 1980 (\$9,634) x Ratio of 1981 to 1980 consumer price index for total medical care where 1967=100 (295.1/267.2) = \$10,640. Total equals \$41,715, or \$42,000 rounded to the nearest \$1,000.
- 6/ Labor or earnings related costs in 1980 (\$13,080) x Ratio of 1981 to 1980 index of adjusted hourly earnings where 1977=100 (138.9/127.3) = \$14,272. Medical related costs in 1980 (\$1,587) x Ratio of 1981 to 1980 consumer price index for total medical care where 1967=100 (295.1/267.2) = \$1,753. Total equals \$16,025 or \$16,000 rounded to the nearest \$1,000.
- 7/ BLS producer price index for total transportation equipment, 1981 (12/68=100).
- 8/ BLS producer price index for total transportation equipment, 1978 (12/68=100).
- 9/ Rounded to nearest \$1,000.
- 10/ Rounded to nearest \$.50.
- 11/ For fuel and oil: Ratio of 1981 to 1978 mean 80/87 aviation gas costs per gallon (\$1.85/\$.89). Source: Reference 38. For maintenance: Ratio of 1981 to 1978 BLS indices of adjusted hourly earnings where 1977=100: 138.9/108.4.
- 12/ Rounded to nearest \$1.00.
- 13/ For fuel and oil: Ratio of 1981 to 1978 mean 100/130 aviation gas costs per gallon (\$1.90/\$.91). Source: Reference 38. For maintenance: Same as footnote 11 above.
- 14/ For fuel and oil: Ratio of 1981 to 1978 mean jet type A fuel costs per gallon (\$1.70/\$.79). Source: Reference 38. For maintenance: Same as footnote 11 above.
- 15/ Weighted by airborne hours per Reference 9.

APPENDIX C

Program Logic of AWOS Establishment Criteria

The AWOS establishment criteria developed in this report for non-towered and non-federal towered airports will be integrated as a FORTRAN subroutine into the Terminal Area Forecast Data System. This appendix outlines the program logic used to compute the Phase I and II benefit/cost ratios in Figures 34-A and 34-B of Chapter VI. Note that benefits and costs relating to freezing precipitation and thunderstorm detection/location are set equal to zero. At the date of this report, the typical AWOS installation is not envisioned by the FAA AWOS Program Office to initially include these sensors. The program also relies on national average values for PIFR and PC and assumes no proximity penalties or remoteness premiums. In actual practice, site-specific values for PIFR and PC will be used and proximity penalties and remoteness premiums will be imposed, if applicable.

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0001 C THIS PROGRAM (DSN=AWOS.FORT) IS DESIGNED TO COMPUTE BATCH
0002 C BENEFIT/COST RATIOS FOR AUTOMATED WEATHER OBSERVING
0003 C SYSTEMS (AWOS) AT NON-TOWERED AND NON-FEDERAL TOWERED
0004 C AIRPORTS. WITH MINOR MODIFICATIONS, THIS PROGRAM CAN
0005 C ALSO BE APPLIED TO AIRPORTS DESIGNATED AS ATCT DISCON-
0006 C TINUANCE CANDIDATES. BENEFIT/COST LOGIC IS INCLUDED
0007 C FOR WIND, TEMPERATURE, DEW POINT, ALTIMETER, CEILING,
0008 C VISIBILITY AND LIQUID PRECIPITATION SENSORS. WHILE
0009 C THE BENEFIT/COST LOGIC FOR FREEZING PRECIPITATION AND
0010 C THUNDERSTORM SENSORS ARE ALSO INCLUDED, THEIR VALUES
0011 C ARE SUPPRESSED IN THIS PROGRAM APPLICATION.
0012 C
0013 C ALL DOLLAR VALUES IN THIS PROGRAM ARE 1981 DOLLARS.
0014 C
0015 C REAL LCC,MINOR,MIN,MLITN,MLLCL,INSBEN,MLAP,NUMER
0016 C DATA NINES/'9999'/
0017 C INTEGER Y,TOWRCD,SLOCID
0018 C REAL*8 STATE,REG
0019 C DIMENSION CITY(7)
0020 C
0021 C ----FE = FACILITIES AND EQUIPMENT COSTS UNIQUE TO EACH SENSOR:
0022 C WIND, TEMPERATURE/DEWPOINT, ALTIMETER, CEILING, VISIBILITY,
0023 C LIQUID PRECIPITATION, FREEZING PRECIPITATION AND THUNDER-
0024 C STORM. WHILE PREFEE = 3208 AND THUNFE = 20160, THEY
0025 C ARE SUPPRESSED IN THIS PROGRAM APPLICATION.
0026 C
0027 C WINDFE=1736.
0028 C TDPFE=1408.
0029 C ALTMFE=3456.
0030 C CEILFE=36433.
0031 C VISIFE=24808.
0032 C PRELFE=1192.
0033 C PREFEE=0.
0034 C THUNFE=0.
0035 C
0036 C ----OM = LIFE-CYCLE OPERATIONS AND MAINTENANCE COSTS UNIQUE
0037 C TO EACH SENSOR: WIND, TEMPERATURE/DEWPOINT, ALTIMETER,
0038 C CEILING, VISIBILITY, LIQUID PRECIPITATION, FREEZING
0039 C PRECIPITATION AND THUNDERSTORM. WHILE PREFOM = 479
0040 C AND THUNOM = 3015, THEY ARE SUPPRESSED IN THIS PROGRAM
0041 C APPLICATION.
0042 C
0043 C WINDOM=263.
0044 C TDPOM=207.
0045 C ALTMOM=518.
0046 C CEILOM=5448.
0047 C VISION=3709.
0048 C PRELOM=175.
0049 C PREFOM=0.
0050 C THUNOM=0.
0051 C
0052 C ----LC = LIFE-CYCLE COST UNIQUE TO EACH SENSOR: WIND,
0053 C

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C  TEMPERATURE/DEWPOINT, ALTIMETER, CEILING, VISIBILITY, LIQUID
C  PRECIPITATION, FREEZING PRECIPITATION AND THUNDERSTORM.
C
0022  WINDLC=WINDFE+WINDOM
0023  TPDPLC=TPDPFE+TPDPOM
0024  ALMLC=ALTMFE+ALINOM
0025  CEILLC=CEILFE+CEILOM
0026  VISILC=VISIFE+VISIOM
0027  PRELLC=PRELFE+PRELOM
0028  PREFLC=PREFFE+PREFOM
0029  THUNLC=THUNFE+THUNOM

C
C  FIXED = FIXED LIFE-CYCLE COSTS COMMON TO ANY SYSTEM
C
0030  FIXED = 49617.

C
C  COMM = OPTIONAL COMMUNICATIONS
C
0031  COMM=21535.

C
C  LCC = TOTAL LIFE-CYCLE COST OF A GIVEN SYSTEM
C  OVER A 15-YEAR ECONOMIC LIFE.
C
0032  LCC=WINDLC+TPDPLC+ALTMLC+CEILLC+VISILC+PRELLC+PREFLC
      +THUNLC+FIXED+COMM

C
C  D = OMB-PRESCRIBED DISCOUNT RATE
C
0033  D=.10

C
C  --ITN = ANNUAL ITINERANT OPERATIONS BY USER CLASS
C  PER TAF. --LCL = ANNUAL LOCAL OPERATIONS BY USER
C  CLASS PER TAF. AP = TOTAL ANNUAL INSTRUMENT APPROACHES
C  PER TAF. GAAP = GA ANNUAL INSTRUMENT APPROACHES PER
C  TAF. MLAP = MILITARY ANNUAL INSTRUMENT APPROACHES PER
C  TAF.
C
0034  DIMENSION ACITN(15),AIITN(15),GAIN(15),MLITN(15),
      EGALCL(15),MLLCL(15),AP(15),GAAP(15),MLAP(15)

C
C  AIRPORT = AIRPORT NAME
C
0035  DIMENSION AIRPORT(11)

C
C  CRITICAL VALUES: VALUE OF A STATISTICAL
C  LIFE (VALLIF), UNIT COST OF A STATISTICAL SERIOUS INJURY
C  (CSTISIN), UNIT COST OF A STATISTICAL MINOR INJURY
C  (CSTMIN), REPLACEMENT VALUE OF A GA AIRCRAFT, NET OF
C  TURBOJETS/FANS (DESTRY), RESTORATION COST OF A
C  SUBSTANTIALLY-DAMAGED GA AIRCRAFT, NET OF TURBOJETS/
C  FANS (SUBDAM), RESTORATION COST OF A MINORLY-DAMAGED
C  GA AIRCRAFT, NET OF TURBOJETS/FANS (MINOR).

```

0036	C	VALLIF=580000.	00001080
0037		CSTIN=42000.	00001090
0038		CSTMIN=16000.	00001100
0039		DESTRY=50000.	00001110
0040		SUBDAM=16000.	00001120
0041		MINOR=8000.	00001130
			00001140
			00001150
			00001160
			00001170
			00001180
			00001190
			00001200
0042	C	PAIFD = PROBABILITY OF AVERTING A GA INSTRUMENT FLIGHT	00001210
	C	DISRUPTION (DECIMAL)	00001220
	C	PAIFD=.10	00001230
	C	CIFD = UNIT COST OF A GA INSTRUMENT FLIGHT DISRUPTION	00001240
	C	CIFD=93.	00001250
0043	C	FIA = FRACTION OF TOTAL GA ITINERANT OPERATIONS THAT ARE	00001260
	C	ARRIVALS (DECIMAL)	00001270
	C	FIA=.50	00001280
	C	FVC = FRACTION OF GA ITINERANT ARRIVALS CONDUCTED IN	00001290
	C	VISUAL CONDITIONS (DECIMAL)	00001300
	C	FVC=.968	00001310
	C	FO = FRACTION OF GA ITINERANT ARRIVALS THAT CAN	00001320
	C	BE EXPECTED TO OVERFLY IN THE ABSENCE OF A	00001330
	C	WEATHER OBSERVATION (DECIMAL)	00001340
	C	FO=.195	00001350
	C	CAO = UNIT COST OF AN OVERFLIGHT	00001360
	C	CAO=.70	00001370
	C	QUAL = COUNTERS FOR NUMBER OF LOCATIONS HAVING	00001380
	C	PHASE II B/C RATIOS OF LESS THAN .50, .50 TO .99,	00001390
	C	1.00 TO 1.49, 1.50 TO 1.99, AND 2.00 OR GREATER.	00001400
	C	QUALA=0.	00001410
	C	QUALB=0.	00001420
	C	QUALC=0.	00001430
	C	QUALD=0.	00001440
	C	QUALE=0.	00001450
	C	LOCID AND SLOCID = LOCATION IDENTIFIER CODES FROM TAF	00001460
	C	AND SCI FILES, RESPECTIVELY. TOWRCD = TOWER CODE.	00001470
	C	PIFR AND RPIFR = PROBABILITY (%) OF WEATHER BELOW VFR MINIMA.	00001480
	C	PC AND RPC = PROBABILITY (%) OF WEATHER BELOW IFR MINIMA.	00001490
	C	TAF IDENT: DD DSN=FAA114.TAF80.FINAL.OCT1882.LOCID.DATA,	00001500
			00001510
			00001520
			00001530
			00001540
			00001550
			00001560
			00001570
			00001580
			00001590

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0053 C UNIT=3400-4,VOL=SER=W54244,LABEL=(,NL),DISP=(OLD,KEEP),
0054 C DCB=(RECFM=F,LRECL=7420,BLKSIZE=7420,DEN=3)
0055 C SCI IDENT: DD DSN=FAA116.SAM.P341.VFRIFR.NONTWR.SCI.DATA,
0056 C DISP=SHR
0057 C
0058 C READ(10,10)SLOCID,RPIFR,RPC
10 FORMAT(A4,F5.2,1X,F5.2)
0059 C PRINT20
20 FORMAT('-',60X,'FIGURE 34-A')
0060 C PRINT30
30 FORMAT('-',28X,'RESULTS OF APPLYING CRITERIA TO ',
0061 C 'NON-TOWERED AND NON-FEDERAL TOWERED AIRPORTS')
0062 C PRINT40
40 FORMAT('-',95X,'LC',7X,'LC',4X,'GA+ML')
0063 C PRINT50
50 FORMAT(' ',93X,'SAFETY',3X,'EFFICY',2X,'AIAS',3X,
0064 C 'PHASE',3X,'PHASE')
0065 C PRINT60
60 FORMAT(' ',7X,'REG',3X,'LOC',6X,'AIRPORT NAME',3X,'CITY',
0066 C '19X','ST',5X,'BENS',5X,'BENS',3X,'YR 1',3X,'I B/C#',2X,
0067 C 'II B/C#')
0068 C PRINT70
70 FORMAT('-',)
0069 C 80 CONTINUE
0070 C BCI = PHASE I BENEFIT/COST RATIO. INITIALIZED AT 0.
0071 C BCI=0.
0072 C COUNT = SUM OF GA AND MILITARY ANNUAL INSTRUMENT
0073 C APPROACHES IN YEAR 1. INITIALIZED AT 0.
0074 C COUNT=0.
0075 C Y = EACH YEAR OF A SYSTEM'S ASSUMED USEFUL LIFE
0076 C OF 15 YEARS
0077 C Y=1.
0078 C COMBEN = ANNUAL BENEFIT TO EITHER THE AIR CARRIER
0079 C OR, REPEAT OR, AIR TAXI USER CLASSES. INITIALIZED AT 0.
0080 C COMBEN=0.
0081 C AIA- = PROJECTED ANNUAL INSTRUMENT APPROACHES OF GA
0082 C AND MILITARY USER CLASSES. INITIALIZED AT 0.
0083 C AIAG=0.
0084 C AIAM=0.
0085 C ANSAFB = GA AND MILITARY SAFETY BENEFITS IN YEAR Y.
0086 C INITIALIZED AT 0.
0087 C
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0074      C      ANSAFB=0.
          C
          C      ANDELB = GA AND MILITARY FLIGHT DISRUPTION BENEFITS
          C      IN YEAR Y. INITIALIZED AT 0.
          C
          C      ANDELB=0.
          C
          C      ANDBEN = SUM OF ANSAFB AND ANDELB. INITIALIZED AT 0.
          C
          C      ANDBEN=0.
          C
          C      ---LCY = LIFE-CYCLE BENEFITS FOR EFFICIENCY (DELLCY),
          C      SAFETY (SAFLCY) AND TOTAL (TOTLCY). INITIALIZED AT 0.
          C
          C      DELLCY=0.
          C      SAFLCY=0.
          C      TOTLCY=0.
          C
          C      90 READ(11,100,END=260)REG,STATE,CITY,ARPORT,LOCID,TOWRCD,
          C      ZACITN,ATIIN,GAIN,GALCL,MLIIN,MLLCL,GAAP,MLAP,AP
          C      100 FORMAT(A5,A5,6A4,A2,10A4,A2,A4,10X,11,17(100X),92X,
          C      Z15F9.0,45X,15F9.0,45X,15F9.0,45X,15F9.0,45X,
          C      Z15F9.0,45X,15F9.0,9(100X),45X,15F9.0,45X,
          C      Z15F9.0,45X,15F9.0)
          C
          C      MIN = CONTROL FOR AVAILABILITY OF MINIMA FROM
          C      SCI DATA FILE: 0 = NO; 1 = YES.
          C
          C      MIN=1.
          C
          C      IF(TOWRCD.NE.0.AND.TOWRCD.NE.7.AND.TOWRCD.NE.9) GO TO 90
          C      110 IF(LOCID.LT.SLOCID) GO TO 130
          C      IF(LOCID.EQ.SLOCID) GO TO 140
          C      READ(10,10,END=120) SLOCID,RPIFR,RPC
          C      GO TO 110
          C      120 SLOCID=NINES
          C      GO TO 110
          C      130 CONTINUE
          C      MIN = 0.
          C      PIFR=13.5
          C      PC=4.95
          C      GO TO 150
          C      140 CONTINUE
          C      PIFR=RPIFR
          C      PC=RPC
          C
          C      TOTOPS = TOTAL AIRCRAFT OPERATIONS IN YEAR Y
          C
          C      150 TOTOPS=ACITN(Y)+ATIIN(Y)+GAIN(Y)+GALCL(Y)+MLIIN(Y)+MLLCL(Y)
          C      IF(TOTOPS.NE.0) GO TO 160
          C
          C      0002120
          C      0002130
          C      0002140
          C      0002150
          C      0002160
          C      0002170
          C      0002180
          C      0002190
          C      0002200
          C      0002210
          C      0002220
          C      0002230
          C      0002240
          C      0002250
          C      0002260
          C      0002270
          C      0002280
          C      0002290
          C      0002300
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          C      0002650

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0100	GO TO 210			00002660
0101	160 CONTINUE			00002670
0102	AIAG = (GAITN(Y)*.5)*((PIFR-PC)/100)*(.8-(.5*(GAITN(Y) E/1010PS)))			00002680
0103	IF(AIAG.EQ.0.OR.GAAP(Y).EQ.0) GO TO 170			00002690
0104	GO TO 180			00002700
0105	170 AIAM=MLAP(Y)			00002710
0106	GO TO 190			00002720
0107	180 CONTINUE			00002730
0108	AIAM=(AIAG/GAAP(Y))*MLAP(Y)			00002740
0109	190 CONTINUE			00002750
0110	IF(AP(Y).NE.0) GO TO 200			00002760
0111	AIAG=0.			00002770
0112	AIAM=0.			00002780
0113	MIN=1.			00002790
0114	200 CONTINUE			00002800
0115	IF(Y.EQ.1) COUNT=AIAG+AIAM			00002810
		C		00002820
	---SAF = ANNUAL SAFETY BENEFITS TO THE GA AND MILITARY	C		00002830
	USER CLASSES BY SENSOR: WIND, TEMPERATURE/DEW POINT,	C		00002840
	CEILING/VISIBILITY, PRECIPITATION AND THUNDERSTORM.	C		00002850
	FOR PURPOSES OF THIS PROGRAM APPLICATION, THNSAF IS	C		00002860
	SUPPRESSED.	C		00002870
		C		00002880
		C		00002890
0116	WINSAF=(((&*VALLIF)+(18*GSTSIN)+(47*GSTMIN)+(15*DESTROY) Z+(162*SUBDAM)+(1*MINOR))/180)*((.000003704*(GAITN(Y)+ EMLITN(Y)))+(C.000002722*(GALCL(Y)+MLLCL(Y))))			00002910
0117	CLVSAF=(((&3*VALLIF)+(25*GSTSIN)+(17*GSTMIN)+(35*DESTROY) Z+(17*SUBDAM)+(0*MINOR))/52)*.0000865*(AIAG+AIAM)			00002920
0118	THNSAF=(((&0*VALLIF)+(0*GSTSIN)+(1*GSTMIN)+(0*DESTROY) Z+(3*SUBDAM)+(0*MINOR))/3)*(C.000000029*(GAITN(Y)+ EMLITN(Y)))+(C.000000017*(GALCL(Y)+MLLCL(Y))))			00002930
0119	TPDSAF=(((&0*VALLIF)+(0*GSTSIN)+(4*GSTMIN)+(0*DESTROY) Z+(7*SUBDAM)+(0*MINOR))/7)*(C.00000101*(GAITN(Y)+ EMLITN(Y)))+(C.000000006*(GALCL(Y)+MLLCL(Y))))			00002940
0120	PRESAF=(((&0*VALLIF)+(2*GSTSIN)+(0*GSTMIN)+(1*DESTROY) Z+(4*SUBDAM)+(0*MINOR))/5)*(C.000000113*(GAITN(Y)+ EMLITN(Y)))+(C.000000067*(GALCL(Y)+MLLCL(Y))))			00002950
0121	THNSAF=0.			00002960
		C		00002970
	ANSAFB = ANNUAL SAFETY BENEFITS	C		00002980
		C		00002990
0122	ANSAFB=WINSAF+TPDSAF+CLVSAF+PRESAF+THNSAF	C		00003000
		C		00003010
	NUMER = NUMERATOR IN RATIO FOR COMPUTING AIR CARRIER	C		00003020
	AND AIR TAXI BENEFITS.	C		00003030
0123	NUMER=ACITN(Y)+ATITN(Y)	C		00003040
		C		00003050
		C		00003060
		C		00003070
		C		00003080
		C		00003090
		C		00003100
		C		00003110
		C		00003120
		C		00003130
		C		00003140
0124	IF(NUMER.GT.3000) NUMER=3000	C		00003150
0125	COMBEN=(NUMER/3000)*9548	C		00003160
		C		00003170

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C      INSBN = ANNUAL BENEFITS OF AVERTED GA AND MILITARY
C      INSTRUMENT FLIGHT DISRUPTIONS
C
0126      INSBN=(AIAG+AIAM)*PAIFD*CFID
C
C      VISBN=ANNUAL BENEFITS OF AVERTED GA AND MILITARY VISUAL
C      FLIGHT DISRUPTIONS
C
0127      VISBN=FIA*FVC*FO*CAO*((GAITN(Y)+MLLCL(Y))*((GALCL(Y)+
      ZMLLCL(Y))*6))
C
C      ANDELB = TOTAL EFFICIENCY BENEFITS
C
0128      ANDELB=COMBEN+INSBN+VISDN
C
C      ANDBEN = TOTAL ANNUAL BENEFITS
C
0129      ANDBEN=ANSAFB+ANDELB
C
0130      SAFLCY=SAFLCY+(ANSAFB*(1/((1+D)**Y-.5)))
0131      DELLCY=DELLCY+(ANDELB*(1/((1+D)**Y-.5)))
0132      TOTLCY=TOTLCY+(ANDBEN*(1/((1+D)**Y-.5)))
C
C      AR = RECIPROCAL OF PROXIMITY PENALTY OR REMOTENESS
C      PREMIUM. FOR PURPOSES OF THIS PROGRAM APPLICATION,
C      AR IS ASSUMED EQUAL TO 1.
C
0133      AR=1.
C
0134      IF(Y.NE.1) GO TO 210
C
C      --BEN = PER OPERATION BENEFITS (FOR PHASE I), APPLIED
C      TO LIFE-CYCLE INFLATOR FACTOR, BY SENSOR: WIND, TEMP-
C      ERATURE/DEN POINT, ALTIMETER, CEILING/VISIBILITY, PRE-
C      CIPITATION AND THUNDERSTORM. FOR PURPOSES OF THIS PROGRAM
C      APPLICATION, THNBEN IS SUPPRESSED.
C
0135      WINBEN=(.2624*(GAITN(1)+MLITN(1)))+(1.1575*(GALCL(1)+MLLCL
      Z(1)))
0136      TPDBEN=(.0025*(GAITN(1)+MLITN(1)))+(1.0015*(GALCL(1)+MLLCL
      Z(1)))
C
0137      ALTBEN=.1488*(GAITN(1)+MLITN(1))
0138      IF(GAAP(1).EQ.0.AND.MLAP(1).EQ.0) ALTBEN=0.
0139      CLVBEN=1.064*(GAITN(1)+MLITN(1))
0140      IF(GAAP(1).EQ.0.AND.MLAP(1).EQ.0) CLVBEN=0.
0141      PREBEN=(.0045*(GAITN(1)+MLITN(1)))+(1.0027*(GALCL(1)+MLLCL
      Z(1)))
C
0142      THNBEN=(.0007*(GAITN(1)+MLITN(1)))+(1.0004*(GALCL(1)+MLLCL
      Z(1)))
0143      THNBEN=0.
C
0144      BCI=((COMBEN*7.976)+((WINBEN+TPDBEN+ALTBEN+CLVBEN+PREBEN+

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0145      EIHNBEN)*14.5))*AR)/LCC
0146      Y=Y+1.
0147      IF(Y.LE.15) GO TO 150

C
C      BCII = PHASE II BENEFIT/COST RATIO
C
0148      BCII=(TOTLCY/LCC)*AR

C
C      220 CONTINUE
C      IF(BCII.LT..5) QUALA=QUALA+1.
C      IF(BCII.GE..5.AND.BCII.LT.1) QUALB=QUALB+1.
C      IF(BCII.GE.1.AND.BCII.LT.1.5) QUALC=QUALC+1.
C      IF(BCII.GE.1.5.AND.BCII.LT.2) QUALD=QUALD+1.
C      IF(BCII.GE.2) QUALE=QUALE+1.
C      IF(MIN.NE.0) GO TO 240
C      PRINT230,REG,LOCID,ARPORT,CITY,STATE,SAFLCY,DELLCY,COUNT,BCI,BCII
C      230 FORMAT(' ',7X,A5,1X,A4,1X,10A4,A2,6A4,A2,1X,A5,F8.0,1X,F8.0,1X,
C      &F5.0,1X,F5.2,'*',2X,F5.2,'*')
C      WRITE(14,235)REG,LOCID,ARPORT,CITY,STATE,SAFLCY,DELLCY,COUNT,
C      &BCI,BCII
C      235 FORMAT(A5,A4,10A4,A2,6A4,A2,A5,F8.0,F8.0,1X,F5.0,F5.2,'*',F5.2,
C      &'*')
C      NUMER=0.
C      GO TO 80
C      240 PRINT250,REG,LOCID,ARPORT,CITY,STATE,SAFLCY,DELLCY,COUNT,BCI,BCII
C      250 FORMAT(' ',7X,A5,1X,A4,1X,10A4,A2,6A4,A2,1X,A5,F8.0,1X,F8.0,1X,
C      &F5.0,1X,F5.2,3X,F5.2)
C      WRITE(14,255)REG,LOCID,ARPORT,CITY,STATE,SAFLCY,DELLCY,COUNT,
C      &BCI,BCII
C      255 FORMAT(A5,A4,10A4,A2,6A4,A2,A5,F8.0,F8.0,F5.0,F5.2,1X,F5.2)
C      260 CONTINUE
C      PRINT270
C      270 FORMAT('1')
C      DO 280 K=1,5
C      280 PRINT290
C      290 FORMAT('...')
C      PRINT300
C      300 FORMAT('...',59X,'RECAP')
C      PRINT310,QUALA
C      310 FORMAT('...',25X,'TOTAL LOCATIONS HAVING PHASE II ',
C      &'BENEFIT/COST RATIOS OF LESS THAN .50',5X,F5.0)
C      PRINT320,QUALB
C      320 FORMAT('0',25X,'TOTAL LOCATIONS HAVING PHASE II ',
C      &'BENEFIT/COST RATIOS FROM .50 TO .99',6X,F5.0)
C      PRINT330,QUALC
C      330 FORMAT('0',25X,'TOTAL LOCATIONS HAVING PHASE II ',
C      &'BENEFIT/COST RATIOS FROM 1.00 TO 1.49',4X,F5.0)
C      PRINT340,QUALD
C      340 FORMAT('0',25X,'TOTAL LOCATIONS HAVING PHASE II ',
C      &'BENEFIT/COST RATIOS FROM 1.50 TO 1.99',4X,F5.0)

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0183      PRINT350,QUALE
0184      350 FORMAT('0',25X,'TOTAL LOCATIONS HAVING PHASE II ',
0185           &' BENEFIT/COST RATIOS OF 2.00 OR GREATER',3X,F5.0)
0186      TOTAL = QUALA+QUALB+QUALC+QUALD+QUALE
0187      PRINT360,TOTAL
0188      360 FORMAT('0',25X,'TOTAL LOCATIONS',58X,F5.0)
0189      PRINT370
0190      370 FORMAT('0',8X,'# BENEFIT/COST RATIO BEFORE PROXIMITY PENALTY ',
0191           &' OR REMOTENESS PREMIUM IF ANY.')
0192      PRINT380
0193      380 FORMAT('0',7X,'# AIRPORTS WITH INSTRUMENT APPROACH PROCEDURES ',
0194           &' FOR WHICH GENERAL AVIATION AND MILITARY ANNUAL INSTRUMENT ',
0195           &' APPROACHES',11X,'(AIAS) WERE COMPUTED WITH THE SCI MODEL ',
0196           &' USING NATIONAL NORMS FOR PIFR (13.5%) AND PC (4.95%) ARE ',
0197           &' IDENTIFIED BY *./11X,'FOR OTHER AIRPORTS WITH INSTRUMENT ',
0198           &' APPROACH PROCEDURES AIAS WERE COMPUTED WITH THE SCI ',
0199           &' MODEL USING VALUES FOR PIFR')
0200      PRINT390
0201      390 FORMAT('0',10X,'AND PC BASED ON SITE-',
0202           &' SPECIFIC MINIMA IN THE SCI FILE. FOR AIRPORTS WITHOUT ',
0203           &' RECORDED AIAS IN THE TAF THE SCI MODEL',
0204           &' 11X,'USED TO REDICT AIAS WAS SUPPRESSED.')
0205      STOP
0206      END

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